Peter Bank

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Curriculum vitae

Employment

July 2007 – present	**Professor of Mathematics (W3)**, *Technische Universität Berlin*
July 2007 – June 2011	**Scientific Director**, *Quantitative Products Laboratory*
July 2006 – June 2007	**Associate Professor of Mathematics**, *Columbia University in the City of New York*
September 2004 – June 2006	**Assistant Professor of Mathematics**, *Columbia University in the City of New York*
September 2003 – December 2003	**Visiting Assistant Professor**, *Columbia University in the City of New York*
May 2002 – September 2004	**Juniorprofessor (W1)** for "Stochastic Analysis and Mathematical Finance", *Humboldt Universität zu Berlin*
February 2001 – April 2002	**Research Assistant (C1)** at the chair "Stochastic Analysis and Mathematical Finance" (Prof. Föllmer), *Humboldt Universität zu Berlin*
March 1997 – January 2001	**Research Fellow** in the project "Stochastic Analysis of Derivatives" of the National Research Center SFB 373 "Quantification und Simulation of Economic Processes" at *Humboldt Universität zu Berlin*

Education

December 2000	**Dr. rer. nat.** at Department of Mathematics of *Humboldt Universität zu Berlin*
December 1996	**Diploma** in Mathematics at *Rheinische Friedrich-Wilhelms-Universität Bonn*
October 1991 – December 1996	**Studies** of Mathematics and Computer Science at *Rheinische Friedrich-Wilhelms-Universität Bonn*

Scientific Interests and Memberships

- Probability theory, particularly Stochastic Analysis
- Stochastic Control and Optimization
- Mathematical Finance and Economics
- Member of the Institute of Mathematical Statistics, Deutsche Mathematiker Vereinigung, Bachelier Finance Society, International Research and Training Group 'Stochastic Models of Complex Processes', DFG-Research Center Matheon
- Scientific Director (2007–2011) of the *Quantitative Products Laboratory*, a joint venture of Deutsche Bank AG as sponsor, Humboldt-Universität, and Technische Universität Berlin

Selected Awards and Prizes ....

- **NSF-Grant 2005–2007** for research on *Stochastic Representation Problems for Optimal Control and Nonlinear Models for Illiquid Financial Markets*

- **Research Fellowship** from Deutsche Forschungsgemeinschaft (German Research Foundation) for a one year research programme at Columbia University, New York, and Carnegie Mellon University, Pittsburgh.

- **Best Paper Award** of the *Blaise Pascal International Conference on Financial Modeling*, Paris 2003, for joint work with Hans Föllmer on "American Options, Multi–armed Bandits, and Optimal Consumption Plans: A Unifying View"; shared with Josef Teichmann.

- **Joachim Tiburtius Prize 2001** of the federal state of Berlin for outstanding dissertations at a Berlin university.

Services to the Research Community

- **Associate Editor 2004–** for "Decisions in Economics and Finance", Springer-Verlag
- **Referee** for Annals of Applied Probability, Annals of Operations Research, Applied Mathematics and Optimization, Electronic Journal of Probability, Finance and Stochastics, Mathematical Finance, SIAM Journal on Control and Optimization, SIAM Journal on Applied Mathematics, Statistics and Probability Letters, Stochastic Processes and their Applications, Stochastics and Stochastic Reports, National Science Foundation, Mathematics and Financial Economics, SIAM Journal on Financial Mathematics, Journal of Economic Decisions and Control
- Member of the **Advisory Board** for the Rutgers University's master program in Mathematical Finance
- co-Organization of **Scientific Events**:
  - *AMaMeF-workshop on Advanced Mathematical Methods in Finance*, Berlin, 2010
  - *Liquidity - Modelling, Recent Crises and Challenges*, Oxford, 2009
  - *Workshops on Mathematical Finance for Young Researchers*, TU Berlin, 2000, 2004, 2008
  - *Columbia-Princeton Probability Days 2005, 2006, and 2007*, Columbia and Princeton University
- Supervised **Ph.D. students**:

  Jeffrey Said Nonlinear Stochastic Models of Liquidity Effects in Financial Markets, Columbia University 2007

  Yun Zhou A Stochastic Representation Problem with Applications in Optimal Singular Control, Dynkin Games, and Obstacle Problems, Columbia University 2008

  Helena Kauppila Convex Duality in Singular Control, Columbia University 2009

  Antje Fruth Portfolio Liquidation with Stochastic Liquidity, TU Berlin 2011

  Marcel Höschler Limit Order Book Models and Optimal Trading Strategies, TU Berlin 2011

  Nadim Sah Trading under Market Frictions, IRTG & TU Berlin, in prep.

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Selected publications and working papers

Articles

- "On Parameter-Dependent Optimal Stopping for One-Dimensional Diffusions", *Electronic Journal of Probability* (2010), 1971-1993 (with C. Baumgarten)
- "On Gittins' Index Theorem in Continuous Time", *Stochastic Processes and Their Applications* (2007), 1357–1371 (with C. Küchler)
- "Optimal Control under a Dynamic Fuel Constraint", *SIAM Journal on Control and Optimization* (2005), Vol. 44(4), 1529-1541
- "A Stochastic Representation Theorem with Applications to Optimization and Obstacle Problems", *Annals of Probability* (2004), Vol. 32, No. 1B, 1030–1067 (with N. El Karoui)
- "American Options, Multi–armed Bandits, and Optimal Consumption Plans: A Unifying View", in *Paris-Princeton Lectures on Mathematical Finance 2002*, Hrsg.: R. Carmona, E. Cinlar, I. Ekeland, E. Jouini, J. Scheinkman, N. Touzi, Lecture Notes in Mathematics, Vol. 1814, Springer, 2003 (with H. Föllmer)
- "Hedging and Portfolio Optimization in Financial Markets with a Large Trader", *Mathematical Finance* (2004), 14, 1–18 (with D. Baum)
- "Optimal Consumption Choice with Intertemporal Substitution", *Annals of Applied Probability* (2001), 11, 750–788 (with F. Riedel)
- "Existence and Structure of Stochastic Equilibria with Intertemporal Substitution", *Finance & Stochastics* (2001), 5, 487–509 (with F. Riedel)
- "Non-Time Additive Utility Maximization — The Case of Certainty", *Journal of Mathematical Economics* (2000), 33, 271–290 (with F. Riedel)

Dissertation

title — *Singular Control of Optional Random Measures — Stochastic Optimization and Representation Problems Arising in the Microeconomic Theory of Intertemporal Consumption Choice*

submitted — October 2000 at *Humboldt University of Berlin*

committee — Nicole El Karoui, École Polytechnique, Paris, France
Hans Föllmer, Humboldt University of Berlin, Germany
Martin Schweizer, ETH Zurich, Switzerland

award — **Joachim Tiburtius Prize 2001** for outstanding dissertations at a Berlin university

Working papers

- "A model of a large investor trading at market indifference prices I: single period case", preprint (with D. Kramkov)
- "A model of a large investor trading at market indifference prices II: continuous-time case", preprint (with D. Kramkov)
- "On a stochastic differential equation arising in a price impact model", preprint (with D. Kramkov)
- "Optimal Order Execution with Deterministic Liquidity Patterns", in preparation (with A. Fruth)
- "An Algorithm for Computing Gittins–Indices and Exercise Signals for American Options", working paper.
- "Optimal Dynamic Choice of Durable and Perishable Goods", Working Paper (2002), *Stanford University* (with F. Riedel)
- "No Free Lunch for Large Investors", Discussion Paper 71 (1999), SFB 373, *Humboldt University of Berlin*
- "Pricing and Hedging of Forwards, Futures and Swaps by Change of Numéraire", Discussion Paper 65 (1997), SFB 373, *Humboldt University of Berlin*

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Selected talks and conference contributions

Invited talks

- Quantitative Methods in Finance Conference, Sydney, December 2011
- Mathematical Finance and Partial Differential Equations, Rutgers, November 20111
- ICIAM 2011, Vancouver, July 2011
- FMC2 Summer School, Dublin, June 2011
- Mathematical Finance Seminar, Warwick University, May 2011
- Workshop on Risk Analysis in Economics and Finance, University of Guanajuato, January 2011
- Workshop on Stochastic Analysis and its Applications, Prague, January 2011
- Conference on the occasion of Walter Schachermayer's 60th birthday, Vienna, July 2010
- 6th World Congress of the Bachelier Finance Society, Toronto, June 2010
- Conference on the occasion of Mark Davis's 60th birthday, Imperial College, London, April 2010
- Probability Colloquium, University of Southern California, Los Angeles, February 2010
- Workshop on the Foundations of Mathematical Finance, Fields Institute, Toronto, January 2010

- Probability Seminar, Columbia University, New York, October 2009
- 2nd SMAI European Summer School in Financial Mathematics, Paris, August 2009
- Liquidity—Modelling, Recent Crises and Challenges, Oxford, June 2009
- Workshop on Mathematical Finance, Istanbul, May 2009
- Spring School of the Marie Curie ITN 'Finance & Insurance: Stochastic Analysis and Pratical Methods' Jena, March 2009
- Stochastic Processes and their Applications and IMS-Bernoulli Meeting, Singapore, July 2008
- Mathematical Finance Seminar of the Stockholm School of Economics, April 2008
- Roundtable on Mathematical Finance, Académie des Sciences, Paris, March 2008
- Conference on Stochastic Processes and Applications to Mathematical Finance, Kyoto, March 2008
- Workshop on Mathematical Finance, Tokyo March 2008
- OCIAM Seminar on Mathematical Finance, Oxford, February 2008
- Oxford-Man Seminar on Stochastic Analysis, Oxford, February 2008
- Oberwolfach Seminar on Stochastic Analysis in Finance and Insurance, January 2008

- Research Seminar of the Chair X-Ponts-SG, Paris, December 2007
- Workshop on Quantitative Finance, Kiel, November 2007
- Talks in Financial and Insurance Mathematics, ETH Zurich, October 2007
- Workshop on Stochastic Filtering and Control, Warwick, August 2007
- AMaMeF conference on 'Innovations in Mathematical Finance', Loen, Norway, June 2007
- Columbia Practitioners Conference in Mathematics of Finance, New York, April 2007
- PIMS-MITACS Math Finance Seminar, University of British Columbia, Vancouver, March 2007
- Financial and Actuarial Mathematics Seminar, University of Michigan, February 2007
- Computational Finance Seminar, Purdue University, February 2007
- Mathematical Finance Seminar, University of Texas at Austin, November 2006

Conference contributions . . . .

- 4^{th} World Congress of the Bachelier Finance Society, Tokyo, July 2006
- 3^{rd} World Congress of the Bachelier Finance Society, Chicago, July 2004
- EMS Mathematical Weekend, Lisbon, September 2003
- Blaise Pascal International Conference on Financial Modeling, Paris, July 2003
- Meeting on Stochastic analysis in Finance and Insurance, Oberwolfach, March 2003
- 2^{nd} World Congress of the Bachelier Finance Society, Crete, June 2002
- Meeting on Stochastic Analysis, Berlin, July 2001
- Workshop on Mathematical Finance for Young Researchers, Berlin, December 2000
- Meeting of the TMR Project on Stochastic Analysis, Lisbon, October 2000
- 1^{st} World Congress of the Bachelier Finance Society, Paris, June/July 2000
- Meeting on Stochastic Analysis in Finance and Insurance, Oberwolfach, May 2000
- Meeting of the London Mathematical Society — Durham Symposium on Stochastic Analysis, Durham, July 1999
- Workshop on Mathematical Finance, Berlin, December 1998