

# Erhan Bayraktar

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**Research Interests**    Mathematical finance, stochastic control, optimal stopping, stochastic analysis, applied probability, insurance mathematics.

**Employment**

- (Full) Professor, Department of Mathematics, University of Michigan, September 2013–.
- Susan Meredith Smith Professor, September 2010–.
- Director of the Quantitative Finance and Risk Management Masters Program, Department of Mathematics, University of Michigan, Jan 2015–.
- Associate Professor (with Tenure), Department of Mathematics, University of Michigan, September 2010-August 2013.
- Assistant Professor (Tenure Track ), Department of Mathematics, University of Michigan, September 2006 - August 2010.
- T. H. Hildebrandt Research Assistant Professor, Department of Mathematics, University of Michigan, September 2004 - August 2006.

**Education**

**Princeton University**, School of Engineering and Applied Science  
Ph.D. in Electrical Engineering, 2004

- **Thesis Advisor:** Professor H. Vincent Poor (member of the U.S. National Academy of Sciences and the National Academy of Engineering, Fellow of the American Academy of Arts and Sciences, International Fellow of the Royal Academy of Engineering of the UK), Michael Henry Strater University Professor of Electrical Engineering.
- **Dissertation Title:** “Topics in Stochastic Processes and Their Applications”.

M.A. in Electrical Engineering, 2002.

**Middle East Technical University**, Ankara, Turkey

B.S., Mathematics, 2000.  
B.S., Electrical Engineering, 2000.

**Grants**

- National Science Foundation, total awarded: \$1,454 428.  
–I was 112th among all mathematicians in the US who got NSF funding in the three year funding period starting at 2011 (2939 mathematicians), see <http://homepages.rpi.edu/~holmes/ranking.2011.html>, 3rd in the department after Ralf Spatzier and Karen Smith (who were the PIs on an RTG grant).

1. National Science Foundation, Division of Mathematical Sciences, Applied Mathematics, Grant no: **DMS-1613170**, 2016 - 2019 (PI), \$339,180.
2. National Science Foundation **CAREER Grant**, Grant no: **DMS-0955463**, \$400,000. 2010-2015.

3. National Science Foundation, Division of Mathematical Sciences, Computational Foundations for Emerging Science Frontiers, Grant no: **DMS-1118673**, 2011-2015, \$304,385 (my portion). (PI, joint with Lifeng Lai and H. Vincent Poor.)
  4. National Science Foundation, Division of Mathematical Sciences, Applied Mathematics, Grant no: **DMS-0906257**, 2009 - 2012 (PI), \$282,175.
  5. National Science Foundation, Division of Mathematical Sciences, Applied Mathematics, Grant no: **DMS-1108593**, Workshop on Stochastic Analysis in Finance and Insurance, May 2011 (PI, joint with Mihai Sirbu and Gordan Žitković), \$40,000.
  6. National Science Foundation, Division of Mathematical Sciences, Applied Mathematics/Coffes, Grant no: **DMS-0604491**, 2006 - 2009 (PI), \$88,688.
- Other Grants
    1. INTECH (Investment Management Firm in Princeton) grant to support the Financial Mathematics Seminar, 2013, \$5,000.
    2. CKER Research Grant, Society of Actuaries, 2012 (joint with Jenny Young), \$25,000.
    3. INTECH grant to support the Workshop on Stochastic Analysis in Finance and Insurance, May 2011, \$10,000.
    4. AERF Research Grant, The Actuarial Foundation, 2009, joint with Jenny Young, \$20,000.
    5. CKER Research Grant, Society of Actuaries, 2007, joint with Mike Ludkovski, \$20,000.
    6. Horace H. Rackham Faculty Grant and Fellowship, University of Michigan, Ann Arbor, MI, 2005-2006.
    7. Independent Contractor for the Institute for Quality Management. (Consultant to the US Army Pantheon Project) (Feb. 05 - Sep. 06).

#### Recent Honors

- Susan Meredith Smith Professorship, September 2010-
- SIAM Activity Group on Financial Mathematics and Engineering (SIAG/FME) (the inaugural) Early Career Prize 2010.

#### Editorial Responsibilities

- Associate Editor for Applied Mathematics and Optimization. (July 2016–)
- Associate Editor for Mathematical Finance. (November 2013–)
- Associate Editor for Mathematics of Operations Research (MOR). (December 2013–)
- Associate Editor for SIAM Journal on Control and Optimization (SICON). (January 2014–)

#### Membership

- Bachelier Finance Society
- SIAM and SIAG FME.

## Postdocs

1. Ibrahim Ekren (Fall 2017-)
2. Nicolas Hernandez (Fall 2017-)
3. Alexandros Saplaouras (Fall 2017-)
4. Zhou Zhou (Fall 2017)
5. Christian Keller (Fall 2015-)
6. Yavor Stoev (Fall 2015-)
7. Asaf Cohen (Fall 2014-July 2017), Tenure track assistant professor at the University of Haifa, Department of Statistics.
8. Bahman Angoshtari (Fall 2014-July 2017), Term Assistant Professor at University of Washington, Department of Applied Mathematics.
9. Jinniao Qiu (January 2016- May 2017), Tenure track assistant Professor at Calgary University, Department of Mathematics and Statistics.
10. Gu Wang (Fall 2013-June 2015.) Tenure track Assistant professor at WPI, Department of Mathematical Sciences.
11. Xiang Yu (Fall 2012-June 2015.) Tenure track Assistant professor at Hong Kong Polytechnic University, Department of Applied Mathematics.
12. Arash Fahim (Winter 2011-July 2013), Tenure track Assistant professor at Florida State University, Department of Mathematics.
13. Tom Emmerling (Fall 2009- July 2012), Senior Quantitative Risk Analyst at M&T Bank Corporation.
14. Qingshuo Song (Fall 2009), Associate Professor at the City University of Hong Kong, Department of Mathematics.
15. Song Yao (Fall 2008-June 2011), Associate Professor at the University of Pittsburgh, Department of Mathematics.

## Ph.D. Students

1. Bo Yang (defended in August 2008), Executive Director, CVA (Counterparty Valuation Adjustment) desk strategist, Morgan Stanley.
2. Hao Xing (defended in April 2009), Associate Professor at the London School of Economics (Department of Statistics).
3. Xueying Hu (defended in January 2012), Vice President, Market risk modeling, Goldman Sachs.
4. Ross Kravitz (defended in January 2013), Senior Data Scientist at Pandora.
5. Yu-Jui Huang (defended on April 30th 2013), Tenure Track Assistant Professor at the Department of Applied Mathematics, University of Colorado-Boulder.
6. Yuchong Zhang (defended on March 31, 2015, post-doc assistant professor at Columbia, tenure track assistant professor at the University of Toronto starting June 2018).
7. Zhou Zhou (defended on April 1, 2015, IMA post-doc 2015-2017, term assistant professor at the University of Michigan Fall 2017, Lecturer B (Tenure track assistant professor) at the University of Sydney, Math Department starting January 2018).
8. Jiaqi Li (defended on August 16, 2016, Associate, Controller modeling, Goldman Sachs).
9. Alexander Munk (defending May 31, 2017; Financial Engineer at Chicago Trading Company).
10. Jia Guo (AIM, third year).
11. Jingjie Zhang (AIM, second year).

12. Xin Zhang (pure, second year)

**Published Journal  
Articles**

My webpage contains the ArXiv links, see the journals' websites for the published versions.

1. Quantile Hedging in a semi-static market with model uncertainty, with Gu Wang, to appear in **Mathematical Methods of Operations Research**.
2. Rate Control Problem under Heavy Traffic with Strategic Servers, with Amarjit Budhiraja, Asaf Cohen, to appear in **Annals of Applied Probability**.
3. Efficient Byzantine Sequential Change Detection, with Georgios Fellouris and Lifeng Lai, to appear in **IEEE Transactions on Information Theory**.
4. Distribution-Constrained Optimal Stopping, with Christopher W. Miller, to appear in **Mathematical Finance**.
5. On Zero-sum Optimal Stopping Games, with Zhou Zhou, to appear in **Applied Mathematics and Optimization**.
6. On Market Viability with Proportional Transaction Cost, with Xiang Yu, to appear in **Mathematical Finance**.
7. Randomized dynamic programming principle and Feynman-Kac representation for optimal control of McKean-Vlasov dynamics, with Andrea Cosso and Huy en Pham, to appear in **Transactions of the American Mathematical Society**.
8. Risk Sensitive Control of the Lifetime Ruin Problem, with Asaf Cohen, to appear in **Applied Mathematics and Optimization**.

**2017:**

9. On Arbitrage and Duality under Model Uncertainty and Portfolio Constraints, with Zhou Zhou, **Mathematical Finance**, Vol 27, No. 4, 988-1012.
10. Super-hedging American Options with Semi-static Trading Strategies under Model Uncertainty, with Zhou Zhou, **International Journal of Theoretical and Applied Finance**, 20 (6), 10 pages.
11. On the Robust Dynkin game, with Song Yao, **Annals of Applied Probability**, Vol. 27, No. 3, 1702-1755.
12. High-Roller Impact: A Large Generalized Game Model of Parimutuel Wagering, with Alex Munk, **Market Microstructure and Liquidity**, 2017, 3 (1), 45 pages.
13. Ergodicity of robust switching control and nonlinear system of quasi variational inequalities with Andrea Cosso and Huy en Pham, **SIAM Journal on Control and Optimization**, 2017, 55(3), 1915-1953.
14. Optimal Stopping with Random Maturity under Nonlinear Expectations, with Song Yao, to appear in **Stochastic Processes and Their Applications**, 2017, 127(8), 2586-2629.

**2016:**

15. Arbitrage, hedging and utility maximization using semi-static trading strategies with American options, with Zhou Zhou, **Annals of Applied Probability**, Vol. 26, No. 6, 3531-3558.
16. A rank based mean field game in the strong formulation, with Yuchong Zhang, **Electronic Communications in Probability**, 2016, Vol. 21, paper no. 72, 1-12.

17. Robust feedback switching control: dynamic programming and viscosity solutions, with Andrea Cosso and H uyen Pham, **SIAM Journal on Control and Optimization**, 54(5), 2594–2628, October 2016.
18. Stochastic Perron for Stochastic Target Problems, with Jiaqi Li, **Journal of Optimization Theory and Applications**, September 2016, Volume 170, Issue 3, 1026–1054
19. Fundamental Theorem of Asset Pricing under Transaction costs and Model uncertainty, with Yuchong Zhang, **Mathematics of Operations Research**, 41 (3), 1039–1054.
20. Optimally Investing to Reach a Bequest Goal, with Jenny Young, **Insurance: Mathematics and Economics**, volume 70, September 2016, 1-10.
21. Minimizing the Probability of Lifetime Drawdown under Constant Consumption, with Bahman Angoshtari and Jenny Young, **Insurance: Mathematics and Economics**, Volume 69, July 2016, 210-223.
22. Optimal Investment to Minimize the Probability of Drawdown, with Bahman Angoshtari and Jenny Young, **Stochastics**, Volume 88 (6), 946-958.
23. On an Optimal Stopping Problem of an Insider, with Zhou Zhou, **Teoriya Veroyatnostei i ee Primeneniya** 61 (1), 181-186; also published as **Theory of Probability and Its Applications** 61 (1) , 133-139, 2017 (SIAM Version).
24. On a Stopping Game in continuous time, with Zhou Zhou, to appear in **Proceedings of the American Mathematical Society**, 144 (8), 3589-3596.
25. An  $\alpha$ -Stable Limit Theorem Under Sublinear Expectation, with Alex Munk, **Bernoulli**, 22 (4), 2548-2578, 2016.
26. Purchasing Term Life Insurance to Reach a Bequest while Consuming, with David Promislow and Jenny Young, **SIAM Journal on Financial Mathematics**, 7(1), 183-214.
27. Stochastic Perron for Stochastic Target Games, with Jiaqi Li, **Annals of Applied Probability**, 26 (2), 1082-1110.

**2015:**

28. Minimizing the Expected Lifetime Spent in Drawdown under Proportional Consumption, with Bahman Angoshtari and Jenny Young, **Finance Research Letters**, Volume 15, November 2015, Pages 106-114.
29. Doubly Reflected BSDEs with Integrable Parameters and Related Dynkin Games, with Song Yao, **Stochastic Processes and Their Applications**, 125 (12), 4489-4542.
30. Weak reflection principle for L evy processes, with Sergey Nadtochiy, **Annals of Applied Probability**, Annals of Applied Probability, 25 (6), 3251-3294.
31. Purchasing Term Life Insurance to Reach a Bequest Goal: Time-Dependent Case, with David Promislow and Jenny Young, **North American Actuarial Journal**, 19 (3), 224-236.
32. Comparing the  $G$ -Normal Distribution to its Classical Counterpart, with Alexander Munk, **Communications on Stochastic Analysis**, 9 (1), 1-18.
33. On hedging American options under model uncertainty, with Yu-Jui Huang and Zhou Zhou, **SIAM Journal on Financial Mathematics (SIFIN)**, 6(1), 425-447.
34. Byzantine Fault Tolerant Distributed Quickest Change Detection, with Lifeng Lai, **SIAM Journal on Control and Optimization**, 53(2), 575-591.

35. Quickest Detection with Discretely Controlled Observations, with Ross Kravitz, **Sequential Analysis**, 34 (1), 77-133.
36. Stochastic Perron's Method for the Probability of lifetime ruin problem under transaction costs, with Yuchong Zhang, **SIAM Journal on Control and Optimization**, 53(1), 91-113.
37. Minimizing the Probability of Lifetime Ruin Under Ambiguity Aversion, with Yuchong Zhang, to appear in **SIAM Journal on Control and Optimization**, 53(1), 58-90, 2015.

**2014:**

38. A note on the Fundamental Theorem of Asset Pricing under model uncertainty, with Yuchong Zhang and Zhou Zhou, **Risks**, 2(4), 425-433.
39. On the Robust Optimal Stopping Problem, with Song Yao, **SIAM Journal on Control and Optimization**, 52(5), 3135-3175.
40. Liquidation in Limit Order Books with Controlled Intensity, with Mike Ludkovski, **Mathematical Finance**, Volume 24, Issue 4, pages 627-650, October.
41. Bayesian Quickest Change Point Detection with Sampling Right Constraints, with Jun Geng and Lifeng Lai, **IEEE Transactions on Information Theory**, Vol. 60, No. 10, 6474-6490.
42. Purchasing Life Insurance to Reach a Bequest Goal, with David Promislow and Jenny Young, **Insurance: Mathematics and Economics**, Volume 58, 204-216, 2014.
43. Quickest Search over Brownian Channels, with Ross Kravitz, **Stochastics**, Volume 86, Issue 3, 473-490, 2014.
44. A Stochastic Approximation for Fully Nonlinear Free Boundary Problems, with Arash Fahim, **Numerical Methods for Partial Differential Equations**, Volume 30, Issue 3, pages 902-929, May 2014.
45. A Note on Applications of Stochastic Ordering to Control Problems in Insurance and Finance, with Nicole Bäuerle, **Stochastics**, Volume 86, Issue 2, 330-340.
46. Stochastic Perron's Method and Verification without smoothness using viscosity comparison: Obstacle Problems and Dynkin Games, with Mihai Sirbu, **Proceedings of the American Mathematical Society**, 142 (4), 1399-1412, 2014.
47. On controller-stopper problems with jumps and their applications to indifference pricing of American options, with Zhou Zhou, **SIFIN (SIAM Journal on Financial Mathematics)**, 5 (1), 20-49, 2014.
48. Optimal reinsurance and investment with unobservable claim size and intensity, with Zhibin Liang, **IME (Insurance: Mathematics and Economics)**, 55 (March 2014), Pages 156-166.
49. Optimal dividends in the dual model under transaction costs, with Andreas Kyprianou and Kazutoshi Yamazaki, **Insurance: Mathematics and Economics**, 54, 133-143, 2014.
50. On the Existence of Consistent Price Systems, with Mikko S. Pakkanen and Hasanjan Sayit, **Stochastic Analysis and Applications**, 32, 152-162, 2014.

**2013:**

51. Stochastic Perron's method for Hamilton-Jacobi-Belman Equations, with Mihai Sirbu, **SICON (SIAM Journal on Control and Optimization)**, 51(6), 4274-4294.

52. Robust maximization of asymptotic growth under covariance uncertainty, with Yu-Jui Huang, **Annals of Applied Probability**, 2013, Vol. 23, No. 5, 1817–1840.
53. On optimal dividends in the dual model, with Andreas Kyprianou and Kazutoshi Yamazaki, **ASTIN Bulletin**, 2013, 43 (3) , pp. 359-372.
54. On the Impulse Control of Jump Diffusions, with Tom Emmerling and Jose-Luis Menaldi, **SIAM Journal on Control and Optimization**, 2013, 51(3), 2612–2637.
55. Life Insurance Purchasing to Maximize Utility of Household Consumption, with Virginia (Jenny) R. Young, **NAAJ**, 2013, 17 (2), 1-22.
56. A Weak Dynamic Programming Principle for Zero-Sum Stochastic Differential Games with Unbounded Controls, with Song Yao, **SIAM Journal on Control and Optimization**, 2013, 51(3), 2036–2080.
57. On the Multi-Dimensional Controller and Stopper Games, with Yu-Jui Huang, **SIAM Journal on Control and Optimization**, 2013, 51 (2), 1263-1297.
58. Stability of exponential utility maximization with respect to market perturbations, with Ross Kravitz, **Stochastic Processes and Their Applications**, 2013, 123 (5), 1671-1690.

**2012:**

59. On outperforming the market portfolio with a given probability, with Yu-Jui Huang and Qingshuo Song, **Annals of Applied Probability**, 2012, 22 (4) 1465–1494.
60. Stochastic Perron’s method and verification without smoothness using viscosity comparison: the linear case, with Mihai Sirbu, **Proceedings of the American Mathematical Society**, 2012, 140, 3645-3654.
61. Regularity of the optimal stopping problem for jump diffusions, with Hao Xing, **SIAM Journal on Control and Optimization**, 50 (3), 1337-1357, 2012.
62. Valuation equations for stochastic volatility models, with Kostas Kardaras and Hao Xing, **SIAM Journal on Financial Mathematics**, 2012, 3, 351-373.
63. Strict Local Martingale Deflators and Pricing American Call-Type Options, with Kostas Kardaras and Hao Xing, **Finance and Stochastics**, 2012, 16(2), 275-291.
64. Quadratic Reflected BSDEs with Unbounded Obstacles, with Song Yao, **Stochastic Processes and Their Applications**, 2012, 122, 1155-1203.

**2011:**

65. Proving the Regularity of the Minimal Probability of Ruin via a Game of Stopping and Control, with Virginia R. Young, **Finance and Stochastics**, 15 (4), 785-818.
66. Optimal Trade Execution in Illiquid Markets, with Mike Ludkovski, **Mathematical Finance** 2011, 21(4), 681-701.
67. A Unified Framework for Pricing Credit and Equity Derivatives, with Bo Yang, **Mathematical Finance**, 2011, 21 (3), pp. 493-517.
68. Minimizing the Probability of Lifetime Ruin under Stochastic Volatility, with Xueying Hu and Jenny Young, **Insurance: Mathematics and Economics**, Volume 49, Issue 2, September 2011, Pages 194-206 .
69. On the Perpetual American Put Options for Level Dependent Volatility Models with Jumps, **Quantitative Finance**, 2011, 11 (3), 335-341.
70. Optimal Stopping for Nonlinear Expectations – Part I, with Song Yao, **Stochastic Processes and Their Applications**, 2011, 121 (2), 185-211.

- 71. Optimal Stopping for Nonlinear Expectations – Part II, with Song Yao, **Stochastic Processes and Their Applications**, 2011, 121 (2), 212-264.
- 72. Pricing Asian Options for Jump Diffusions, with Hao Xing, **Mathematical Finance**, 2011, 21 (1), 117-143.
- 73. On the Continuity of Stochastic Exit Time Control Problems, with Qingshuo Song and Jie Yang, **Stochastic Analysis and Applications**, 2011, 29, 1-13.

**2010:**

- 74. Optimal Stopping for Dynamic Convex Risk Measures, with Ioannis Karatzas and Song Yao, **Illinois Journal of Mathematics**, A special volume in honor of Donald Burkholder, 54 (3), 1025-1067 (Fall 2010).
- 75. On the Stickiness Property, with Hasanjan Sayit, **Quantitative Finance**, 2010, 10 (10), 1109-1112.
- 76. On the uniqueness of classical solutions of Cauchy problems, with Hao Xing, **Proceedings of the American Mathematical Society**, 2010, 138 (6), 2061-2064.
- 77. On the One-Dimensional Optimal Switching Problem, with Masahiko Egami, **Mathematics of Operations Research**, 2010, 35 (1), 140-159.
- 78. Inventory Management with Partially Observed Non-stationary Demand, with Mike Ludkovski, **Annals of Operations Research**, 2010, 176 (1), 7-39.
- 79. Optimal investment strategy to minimize occupation time, with Virginia R. Young, **Annals of Operations Research**, 2010, 176 (1), 389-408.
- 80. A Unified Treatment of Dividend Payment Problems under Fixed Cost and Implementation Delays, with Masa Egami, **Mathematical Methods of Operations Research**, 2010, 71 (2), 325-351.
- 81. No Arbitrage Conditions For Simple Trading Strategies, with Hasanjan Sayit, **Annals of Finance**, 2010, 6 (1), 147-156.

**2009:**

- 82. Analysis of the Optimal Exercise Boundary of American Options for Jump Diffusions, with Hao Xing, **SIAM Journal on Mathematical Analysis**, 2009, 41 (2), 825-860.
- 83. A Proof of the Smoothness of the Finite Time Horizon American Put Option for Jump Diffusions, **SIAM Journal on Control and Optimization**, 2009, 48, (2), 551-572.
- 84. Pricing American Options for Jump Diffusions by Iterating optimal stopping problems for Diffusions, with Hao Xing, **Mathematical Methods of Operations Research**, (2009), 70 (3), 505-525.
- 85. Multi-scale Time- Changed Birth Processes for Pricing Multi-Name Credit Derivatives, with Bo Yang, **Applied Mathematical Finance**, 2009, 16 (5), 429-449.
- 86. Valuation of Mortality Risk via the Instantaneous Sharpe Ratio: Applications to Life Annuities, with Moshe Milevsky, David Promislow and Virginia Young, **Journal of Economic Dynamics and Control**, 2009, 33 (3), 676-691.
- 87. A Sequential Tracking of a Hidden Markov Chain Using Point Process Observations, with Mike Ludkovski, **Stochastic Processes and their Applications**, 2009, 119 (6), 1792-1822.
- 88. Online Change Detection for a Poisson Process with a Phase-Type Change-Time Prior Distribution, with Semih Sezer, **Sequential Analysis**, 2009, 28 (2), 218-250.



- 89. Relative Hedging of Systematic Mortality Risk, with Mike Ludkovski, **North American Actuarial Journal (NAAJ)**, 2009, Volume 13 (1), 106-140.
- 90. Optimal Deferred Life Annuities to Minimize the Probability of Lifetime Ruin with Virginia Young, **NAAJ**, 2009, Volume 13 (1), 141-154.
- 91. Minimizing the Lifetime Shortfall or Shortfall at Death, with Virginia R. Young, **Insurance: Mathematics and Economics**, 2009, 44 (3), 447-458.

**2008:**

- 92. Maximizing Utility of Consumption Subject to a Constraint on the Probability of Lifetime Ruin, Virginia R. Young, **Finance and Research Letters**, 2008, 5 (4), 204-212.
- 93. A Note on Pricing Options on Defaultable Stocks, **Applied Mathematical Finance**, 2008, 15 (3), 277-304.
- 94. Minimizing the Probability of Lifetime Ruin under Random Consumption, with Kristen Moore and Virginia R. Young, **NAAJ**, 2008, 12 (4), 384-400.
- 95. Minimizing the Probability of Ruin when Consumption is Ratcheted, with Virginia R. Young, **NAAJ**, 2008, 12 (4), 428-442.
- 96. Pricing Options in Incomplete Equity Markets via the Instantaneous Sharpe Ratio, with Virginia R. Young, **Annals of Finance**, 2008, 4 (4), 399-429.
- 97. An Analysis of Monotone Follower Problems for Diffusion Processes, with Masahiko Egami, **Mathematics of Operations Research**, 2008, 33 (2), 336-350.
- 98. Mutual Fund Theorems when Minimizing the Probability of Lifetime Ruin, with Virginia R. Young, **Finance and Research Letters**, 2008, 5 (2), 69-78.
- 99. Optimal Time To Change Premiums, with H. Vincent Poor, **Mathematical Methods of Operations Research**, 2008, 68 (1), 125-158.
- 100. Optimizing Venture Capital Investments in a Jump Diffusion Mode, with Masa Egami, **Mathematical Methods of Operations Research**, 2008, 67 (1), 21-42.
- 101. Queueing Theoretic Approaches to Financial Price Fluctuations, with Ulrich Horst and Ronnie Sircar, **Handbooks in OR&MS: Financial Engineering** (Elsevier), 2008, vol 15, eds. John Birge and Vadim Linetsky.

**2007:**

- 102. Correspondence between Lifetime Minimum Wealth and Utility of Consumption, with Virginia R. Young, **Finance and Stochastics**, 2007, 11 (2), 213-236.
- 103. The effects of decision delay on decision making under uncertainty, with Masa Egami, **Stochastic Processes and Their Applications**, 2007, 117 (3), 333-358.
- 104. Quickest Detection of a Minimum of Two Poisson Disorder Times, with H. Vincent Poor, **SIAM Journal on Control and Optimization**, 2007, 46 (1), 308-331.
- 105. Minimizing the Probability of Lifetime Ruin under Borrowing Constraints, with Virginia R. Young, **Insurance: Mathematics and Economics**, 2007, 41: 196-221.
- 106. Hedging Life Insurance with Pure Endowments, with V. R. Young, **Insurance: Mathematics and Economics**, 2007, 40 (3), 435-444.

**2006:**

107. Adaptive Poisson Disorder Problem, with Savas Dayanik and Ioannis Karatzas, **Annals of Applied Probability**, 2006, 16 (3), 1190-1261.
108. A Limit Theorem for Financial Markets with Inert Investors with Ulrich Horst and Ronnie Sircar, **Mathematics of Operations Research**, 2006, 31 (4), 789-810.
109. Poisson Disorder Problem with Exponential Penalty for Delay, with Savas Dayanik, **Mathematics of Operations Research**, 2006, 31 (2), 217-233.
110. Projecting the Forward Rate Flow onto a Finite Dimensional Manifold, with Li Chen and H. Vincent Poor, **International Journal of Theoretical and Applied Finance**, 2006, 5, 777-785.

**2005:**

111. Stochastic Differential Games in a Non-Markovian Setting, with H. Vincent Poor, **SIAM Journal on Control and Optimization**, 2005, 43 (5), 1737-1756.
112. Standard Poisson Disorder Problem Revisited, with Savas Dayanik and Ioannis Karatzas, **Stochastic Processes and Their Applications**, 2005, 115 (9), 1437-1450.
113. Consistency Problems for Jump-Diffusion Models, with Li Chen and H. Vincent Poor, **Applied Mathematical Finance**, 2005, 12 (2), 101-119.
114. Arbitrage in Fractal Modulated Markets When the Volatility is Stochastic, with H. Vincent Poor, **International Journal of Theoretical and Applied Finance**, 2005, 8 (3), 1-18.
115. Prediction and Tracking of Long Range Dependent Sequences, with H. Vincent Poor and Raghuveer Rao, **Systems & Control Letters**, 2005, 54 (11), 1083-1090.

**2004:**

116. Estimating the Fractal Dimension of the S&P 500 Index Using Wavelet Analysis, with H. Vincent Poor and Ronnie Sircar, **International Journal of Theoretical and Applied Finance**, 2004, 7 (5), 615-643.

**Publications by  
Journal Name**

- Annals of Applied Probability (8)
- Annals of Finance (2)
- Annals of Operations Research (2)
- Applied Mathematical Finance (3)
- Applied Mathematics and Optimization (2)
- Astin Bulletin (1)
- Bernoulli (1)
- Communications on Stochastic Analysis (1)
- Electronic Communications in Probability (1)
- Finance and Stochastics (3)
- Finance Research Letters (3)
- Handbook of Operations Research and Management Science (1)
- IEEE Transactions on Information Theory (2)
- Illinois Journal of Mathematics (1)
- Insurance: Mathematics and Economics (9)
- International Journal of Theoretical and Applied Finance (4)

- Journal of Economic Dynamics and Control (1)
- Journal of Optimization Theory and Applications (1)
- Market Microstructure and Liquidity (1)
- Mathematical Finance (7)
- Mathematical Methods of Operations Research (5)
- Mathematics of Operations Research (5)
- North American Actuarial Journal (6)
- Numerical Methods for Partial Differential Equations (1)
- Proceedings of the American Mathematical Society (4)
- Quantitative Finance (2)
- Risks (1)
- Sequential Analysis (2)
- SIAM Journal on Control and Optimization (14)
- SIAM Journal on Financial Mathematics (4)
- SIAM Journal on Mathematical Analysis (1)
- Stochastics (3)
- Stochastic Analysis and Applications (2)
- Stochastic Processes and Their Applications (9)
- Systems and Control Letters (1)
- Theory of Probability and Its Applications (1)
- Transactions of the American Mathematical Society (1)

## Conference Publications

1. Quickest Change Point Detection with Sampling Right Constraints, with Jun Geng and Lifeng Lai, **Proceedings of the 50th Allerton Conference on Communication, Control, and Computing**, October 2012.
2. Proving the Regularity of the Minimal Probability of Ruin via a Game of Stopping and Control (slides), **Proceedings of the 6th Conference in Actuarial Science and Finance on Samos**, 2010.
3. Pricing American Options for Jump Diffusions with Iterated SOR with Hao Xing, **Proceedings of Financial Engineering and Applications-2007**, Berkeley, September 2007.
4. Quickest Detection of a Minimum of Disorder Times with H. V. Poor, **Proceedings of the IEEE Conference on Decision and Control and European Control Conference ECC 2005**, Seville, December 12-15.
5. Multi-source Change Detection for Compound Poisson Processes, with H. V. Poor, **Proceedings of 43th Annual Allerton Conference on Communication, Control, and Computing**, Allerton, Illinois, September 28-30, 2005.
6. Prediction and Tracking of Long Range Dependent Sequences, with H. Vincent Poor and R. Rao, **Proceedings of the 38th Annual Conference on Information Sciences and Systems**, Princeton, March 2004.
7. Signal Processing Models for Discrete-Time Self-Similar and Multifractal Processes, with Raghuvver Rao, Seungsin Lee, and H. Vincent Poor, **Proceedings of the 37th Asilomar Conference on Signals, Systems and Computers**, California, Nov. 9-12, 2003.
8. Efficient Estimation of the Hurst Parameter in High Frequency Financial Data with Seasonalities Using Wavelets, with H. Vincent Poor and K. Ronnie Sircar, **Proceedings of the 2003 IEEE International Conference on Computational Intelligence for Financial Engineering**, Hong-Kong, March, 20-23, 309-316.

## Recently completed papers

The ArXiv links are available on my website.

1. A numerical scheme for a mean field game in some queuing systems based on Markov chain approximation method, with Amarjit Budhiraja and Asaf Cohen.
2. Multi-Chart Detection Procedure for Bayesian Quickest Change-Point Detection with Unknown Post-Change Parameters, with Jun Geng and Lifeng Lai.
3. Dynamic Programming Principles for Optimal Stopping with Expectation Constraint, with Song Yao.
4. Analysis of a Finite State Many Player Game Using its Master Equation , with Asaf Cohen.
5. Path-dependent Hamilton-Jacobi equations in infinite dimensions, with Christian Keller.
6. Controlled Reflected SDEs and Neumann Problem for Backward SPDEs, with Jinniao Qiu.
7. Mini Flash-Crashes and Their Origins, with Alex Munk.
8. Solvability of the non-linear Dirichlet problem with jumps, with Qingshuo Song.
9. Convergence of approximation schemes for weakly nonlocal second order equations, with Parsiad Azimzadeh and George Labahn.
10. Recombining Tree Approximations for Optimal Stopping for Diffusions, with Yan Dolinsky and Jia Guo.
11. Martingale optimal transport with stopping, Alexander Cox and Yavor Stoev.
12. On the controller-stopper problems with controlled jumps, with Jiaqi Li.
13. No-arbitrage and hedging with liquid American options, with Zhou Zhou.
14. Optimal Investment with Unbounded Random Endowments and Transaction Costs: Duality Theory and Connections to the Shadow Price Process, with Xiang Yu.

## Teaching Experience

- University of Michigan

1. Math 626 Stochastic Analysis/Control: Winter 2008, Winter 2009, Winter 2012, Winter 2013, Winter 2015, Winter 2017.
2. Math 625 (Stat 625), Probability Theory: Winter 2007, Fall 2007, Fall 2008, Fall 2011, Fall 2013, Fall 2014, Fall 2017.
3. Math 623 (IOE 623), Computational Finance: Fall 2004, Winter 2005, Winter 2006, Fall 2006, Fall 2010, Winter 2011, Fall 2015.
4. Math 526 (Stat 526), Discrete Time Stochastic Processes, Fall 2008, Fall 2016.
5. Math 506, Continuous Time Stochastic Analysis for Finance, Fall 2007, Winter 2018.
6. Math 423, Introduction to Mathematical Finance: Fall 2005, Winter 2012, Winter 2013.

**Independent Study.** The following courses are voluntary, i.e., in addition to my ordinary teaching duties.

7. Math 700, reading course with Alex Munk: Winter 2015, Fall 2015.
8. Math 700, reading course with Zhou Zhou: Fall 2012.
9. Math 700, reading course with Ross Kravitz: Fall 2008.
10. Math 700, reading course with Xueying Hu: Fall 2007.
11. Math 499, reading course with undergraduate engineering student Aditya Dabas: Winter 2007.
12. Math 399, reading course with exchange sophomore students from an actuarial program in Australia.

- Princeton University (Teaching Assistant)

1. Digital Signal Processing, ELE 482, 2001.
2. The Wireless Revolution: Telecommunications for the 21st Century, ELE 391, 2003.
3. Introduction to Electrical Signals and Systems, ELE 201, 2000.

**Thesis Committee  
Member of the  
following students  
(besides my own  
students)**

1. Hyekyung Min (2007, UM, AIM (Applied and Interdisciplinary Mathematics)).
2. Ou Zhao (2008, UM, Statistics).
3. Ramji Venkataramanan (2008, UM, Electrical Engineering).
4. Matt Linn (2009, UM, Statistics).
5. Bobby Reiner (2010, UM, Statistics).
6. Ali Nazari (2011, UM, Electrical Engineering).
7. Ting Wang (2011, UM, AIM).
8. Jung Hyun Bae (2011, UM, Electrical Engineering).
9. Paul Gassiat (2011, Paris 7 (Diderot), Mathematics).
10. Xiang Yu (2012, University of Texas at Austin, Mathematics).
11. Jingchen Wu (2013, UM, AIM).
12. Vladimir Lubyshev (2015, Rutgers University, Mathematics).
13. Gaoyue Guo (October 2016, Ecole-Polytechnique)
14. Roman Gayduk (May 2017, UM Math).
15. Nicolas Hernandez (June 2017, Paris Dauphine).

**University of Michigan African Presidential Scholar** I hosted Ph.D. student Dennis Ikpe (who graduated from the applied mathematics program from The University of Cape Town in June 2016) for the 2014-2015 academic year. Dr. Ikpe is now an assistant professor in the math department at UNISA (University of South Africa).

**Service**

- Departmental Service
  - **Program director of the Quantitative Finance and Risk Management Masters Program**, January 2015 (inception)-
  - **Financial/Actuarial Area Leader, Fall 2015-**
  - Organizer of the Financial/Actuarial Mathematics Seminar at Michigan
  - Financial Mathematics Faculty and Post-doc hiring.
  - Consultant, Education and Course Oversight Committee, Fall 2016–
  - Masters Committee, Fall 2016-
  - Quant MOU Committee Fall 2017–
  - Representative in the University Senate Assembly, Fall 2011-Spring 2014.
  - Transfer Credit Evaluation Committee, Fall 2013-Spring 2015.
  - Served on the AIM Admissions and Fellowships Committee (2007-2009) and the External Liaison Committee (2006–2012).
  - Member of the Math/Stat position hiring committee 2010-2011.
- Editorial responsibilities are described on the 2nd page.
- Service as a reviewer
  - As a panelist: Served as a member of the NSF (National Science Foundation) DMS Division of Mathematical Sciences panels: AMC-SS (1), Financial Mathematics (3).
  - As a reviewer of grant proposals: NSF DMS Applied Mathematic (3 panels), NSA (National Security Agency), NSERC (Natural Sciences and Engineering Research Council of Canada), SSHRC (Social Sciences and Humanities Research Council of Canada), MITACS (Mathematics of Information Technology and Complex Systems), Swiss National Science Foundation, Research Grant Council (RGC) of Hong Kong, Summer Course Grant Application to the Croucher Foundation of Hong-Kong, New Researchers Start-up Program proposal of the Fonds Quebecois de la recherche sur la nature et les technologies, and and City University of New York (CUNY) Collaborative Incentive Research Grant, Field Institute's (Toronto, Canada) Thematic and Focus Program.

- *Risks* guest editor [of “Application of Stochastic Processes in Insurance” Special Issue, submission deadline October 2013].
- As a reviewer of journal articles: Acta Applicanda Mathematicae, Annals of Applied Probability, Annals of Probability, Communications on Stochastic Analysis, Electronic Communications in Probability, Electronic Journal of Probability, European Journal of Finance, European Journal of Operational Research, IEEE Transactions on Automatic Control, IEEE Transactions on Information Theory, Illinois Journal of Mathematics, Interfaces and Free Boundaries, International Journal of Theoretical and Applied Finance, Journal of Applied Probability, Journal of Banking and Finance, Journal of Economic Dynamics and Control, Journal of Mathematical Analysis and Applications, Mathematics and Financial Economics, Management Science, Mathematical Finance, Mathematical Methods of Operations Research, Mathematical Reviews, Mathematics of Operations Research, Michigan Mathematical Journal, North American Actuarial Journal, Operations Research, Operations Research Letters, Probability Theory and Related Fields, Proceedings of AMS, Quantitative Finance, SIAM Journal on Control and Optimization, SIAM Journal on Financial Mathematics, SIAM Journal on Multi-scale Modeling and Simulation, Stochastic Processes and Their Applications, Systems and Control Letters.
- Service as a conference organizer.
  1. Organizer (with Romuald Elie, Johannes Muhle-Karbe and Sergey Nadtochiy) of a Young Researcher Workshop on Mathematical Finance, to be held in Ann Arbor, March 27-31 2017: \$40,000.
  2. Organizer (with Johannes Muhle-Karbe and Sergey Nadtochiy) of the Workshop on Stochastic Analysis in Finance and Insurance, University of Michigan, June 2016. Total budget: \$75,000.
  3. Organizer (with Mihai Sirbu and Gordan Zitkovic) of the Workshop on Stochastic Analysis in Finance and Insurance, University of Michigan, May 2011 (17-20). Total budget: \$60,000.
  4. Co-organizer of the Workshop on Financial Engineering for Actuarial Mathematics, May 2007, Ann Arbor, Michigan.
- Organization role at conferences/societies
  1. **Scientific Committee of the 10th World Congress of the Bachelier Finance Society**, Dublin, Ireland, July 16-20, 2018.
  2. Scientific Committee of the National Mathematical Congress of Turkey, 2017.
  3. SIAG/FME Nominating Committee, 2016.
  4. **Organizing/Scientific Committee Member of the SIAM Conference on Financial Mathematics & Engineering (FM14) to be held in Chicago, November 13-15, 2014**
  5. **Member of the committee for SIAG/FME Junior Scientist Prize, 2014.**
  6. Organizer of the mini-symposium on Stochastic Control in Finance in the SIAM Conference on Financial Mathematics and Engineering (FM12) July 9-11, 2012, Minneapolis.
  7. Organizer of the mini-symposium on optimal stopping in the SIAM Conference on Financial Mathematics and Engineering (FM10) November 19-20, 2010, San Francisco.
  8. Member of the Scientific Committee of the Rutgers Mathematical Finance and Partial Differential Equations Conference, December 2009 & 2011.
  9. Organizer (along with Tim Leung and Birgit Rudlof) of the 3 Special Sessions on Financial Mathematics at the AMS Annual Meeting in 2009.
  10. Organizer of the Finance and Stochastics session at the annual INFORMS meetings in 2009 (San Diego), in 2006 (Pittsburgh), and in 2005 (San Francisco).
  11. Organizer of the session on Optimal Stopping in the SIAM Conference on Financial Engineering in Fall 2008.

12. Member of the International Program Committee (IPC) for the Third IASTED International Conference on Financial Engineering and Applications (in 2006, 2007), and organizer of the special session on Finance and Stochastics in 2007.
13. Organizer of the Finance and Stochastics Session for the Informs International Conference in 2007 (Puerto-Rico).
14. Organizer of a mini-syposium on applied probability, insurance mathematics and actuarial finance in the SIAM Annual Meeting in 2006 (Boston).

**Research Visits and  
Talks**

**2018**

1. **METE - Mathematics and Economics: Trends and Explorations) June 4-8 at the Forschungsinstitut Mathematik (FIM) of ETH Zurich.**

**2017**

1. **Workshop “Advances in Stochastic Analysis for Risk Modeling”, CIRM (France)**, Nov 13-17.
2. Minisymposium on Stochastic Control and Applications organized by George Yin and Jionming Yong at the SIAM Conference on Control and Applications CT17, July 10-12 at Pittsburgh.
3. Robust Methods in Probability & Finance, ICERM, Brown University, June 19-23.
4. Financial Math Seminar, Dipartimento di Economia e Finanza LUISS, Rome, May 19.
5. **De Finetti Risk Seminar in Milano, May 17.**
6. Probability and Mathematical Finance Seminar, Carnegie Mellon, Department of Mathematical Sciences, May 1.
7. Fields Institute Quantitative Finance Seminar series, April 26.
8. Invited lecture at the 16th Winter School on mathematical finance, Netherlands, January 23-25.

**2016**

1. Invited Mini-symposium speaker in ”Robust, model free and semi-parametric methods in math finance” organized by Matt Lorig, November 17-19.
2. **Plenary speaker at the 9th World Congress of the Bachelier Finance Society, NYC, July 15-19.**
3. **HVP65–A workshop honoring Vince Poor**, Barcelona, July 9th.
4. Mathematical Finance, Risk and Uncertainty, a joint seminar series created by the Departments of Math, Finance and Industrial Engineering, UIUC, May 9th.
5. Invited speaker at the Risk and Stochastic Conference, London School of Economics, April 21-22.
6. Invited speaker at the Eastern Conference on Mathematical Finance held on March 18-20, 2016 at Worcester Polytechnic Institute.

**2015**

1. **ORFE Colloquium, Princeton University, October 6.**
2. **Colloquium, H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech, September 16.**
3. Invited speaker in the Stochastic Control Session at the AMS Sectional Meeting at Michigan State University in East Lansing, Michigan, March 14-15, 2015
4. Invited speaker at “Paris - Southeast Asia Conference in Mathematical Finance”, February 7-11, Siam Reap, Cambodia.
5. **Plenary speaker at NUS-University of Paris Diderot Workshop on Quantitative Finance**, 4-5 February 2015, at the National University of Singapore.

## 2014

1. **Boeing Distinguished Colloquium, University of Washington, Nov 20.**
2. Invited mini-symposium speaker at the SIAM Conference on Financial Mathematics and Engineering (FM14), Nov 13-15.
3. Conference at the University of Chicago, Trading and Portfolio Strategies, November 11-12. (Plenary speaker.)
4. **Financial Mathematics Seminar, Princeton University, September 11.**
5. **Invited speaker in the workshop entitled New Directions in Financial Mathematics and Mathematical Economics at the Banff International Research Station (BIRS), in Alberta, Canada, July 6-11 (by invitation only event).**
6. Visited Professor Huy en Pham (Paris 7), June 8-24.
7. **Plenary talk at Labex Louis Bachelier - SIAM-SMAI Conference** on Financial Mathematics: Advanced Modeling and Numerical Methods, June 17-20, 2014, Paris.
8. Colloquium of ISFA (Institut de Science Financiere et d'Assurances), University of Lyon 1, June 4. (Visited Professor Setfan Loisel June 1-8.)
9. Mathematical Finance colloquium, Dublin City University, May 28. (Visited Professor Paolo Guasoni May 17-June 1).
10. **Oberwolfach workshop** on Stochastic Analysis in Finance and Insurance, May 4-10 (by invitation only event).
11. **Columbia Mathematical Finance Seminar**, March 6.

## 2013

1. Invited speaker at the Isaac Newton Institute in Cambridge, UK “Mathematical and Physical Sciences of Modern Financial Markets: Computerised Trading at Low and High Frequency”, 19-21 November 2013, (by invitation only event).
2. One week visit to Universit  du Maine (Laboratoire Manceau de Math matiques), Le Mans, France, Oct 6-12, 2013. (Gave a talk in the probability and statistics seminar.)
3. Financial Mathematics Seminar, University of Pittsburgh , Feb 11, 2013.

## 2012

1. Mathematics Colloquium, WPI, Dec. 7.
2. Statistics and Probability Seminar, Department of Mathematics and Statistics, Boston University, Dec. 6.
3. 2012 Algorithm Workshop (organized by NSF), November 26th-29th in San Diego, CA.
4. Visiting ETH (Professor Mete Soner), November 5-8 and gave the financial mathematics colloquium.
5. **International Conference on Advanced Stochastic Optimization Problems organized by the Steklov Institute of Math, Moscow, September 24-28, plenary speaker.**
6. USC Mathematical Finance Colloquium, Sep. 17.
7. SIAM Conference on Financial Mathematics and Engineering, July 9-11. Invited speaker in the mini symposium entitled “Stochastic Control in Finance”.
8. **Probability, Control and Finance: A Conference in Honor of the 60th Birthday of Ioannis Karatzas, June 4-8, 2012, NYC, plenary speaker.**
9. Mathematical Finance Seminar, University of Evry, Dept. of Math, May 31, 2012, France. (Visited University of Evry May 17-June 1.)
10. Financial Mathematics Seminar, ETH, Zurich, May 10. (Visited ETH, FIM (Institute for Mathematical Research) May 2-17.)
11. Finance and Stochastics Seminar, Imperial College, Department of Mathematics, March 14, 2012.



12. Actuarial and Financial Mathematics Conference, Brussels, February 9-12, 2012, plenary speaker.

## 2011

1. University of Minnesota, Mathematics Colloquium, Dec 1, 2011.
2. Liquidity Risk Modeling workshop organized by the University of Evry, Nov 18-19, 2011, Paris.
3. Mathematical Finance Seminar, University of Evry, Nov. 17, 2011.
4. University of Sydney, School of Mathematics Colloquium, Nov 4.
5. Mathematical Finance Colloquium, USC, October 17.
6. Mathematics Colloquium, Rutgers University, September 16.
7. Economics Colloquium, Rutgers University, September 15.
8. International Conference on Mathematical Finance and Economics, Istanbul, July 6-8 (Plenary speaker).
9. The 35th Conference on Stochastic Processes and their Applications, Oaxaca, Mexico, June 19-24. (Invited speaker.)
10. The 6th Symposium on BSDEs and Applications, the University of Southern California (USC), June 8-10, 2011. (Invited Speaker)
11. Advances in Portfolio Theory and Investment Management, Oxford-Man Institute, University of Oxford, May 12, 13 and 14. (Keynote speaker).
12. Risk & Stochastics Seminar, London School of Economics, May 11, 2011.
13. Bachelier Seminar, l'Institut Henri Poincare, Paris, May 6th (& visiting Professor Huyên Pham at University of Paris 7 (Diderot) for a week).
14. Mathematical Finance Seminar, Paris 6 and 7, France, May 5.
15. Mathematics Colloquium, Wayne State University, April 18.
16. Inaugural lecture for the Susan M. Smith Chair, University of Michigan, March 22.
17. Cornell ORIE Colloquium, January 25.

## 2010

1. Mathematical Finance and Partial Differential Equations Conference 2010 at Rutgers University (Keynote Speaker).
2. Math Colloquium, Ohio State University (December 3rd).
3. SIAM Conference on Financial Mathematics and Engineering (FM10) November 19-20, 2010, San Francisco, plenary speaker and organizer of a session on optimal stopping.
4. Risk Seminar, Joint seminar of Columbia Statistics and CUNY Graduate Center Math. Nov 5, 2010.
5. Bachelier Finance Society World Congress, Fields Institute, Toronto, June 22-26, 2010 (Invited speaker in the Stochastic Control Theme).
6. IMA Workshop, New Mathematical Models in Economics and Finance, June 9-18.
7. 6th Conference in Actuarial Science & Finance on Samos, June 3-6, 2010 (keynote speaker).
8. Financial Mathematics Seminar, University of Texas at Austin, April 23, 2010.
9. Western Michigan University, Mathematics Colloquium, March 18, 2010.
10. Montreal Seminar of Actuarial and Financial Mathematics, March 12, 2010.
11. Center for Research in Financial Mathematics and Statistics (seminar), UCSB, February 22, 2010.

## 2009

1. Cornell University, Department of Mathematics, Probability Seminar, Oct 19th, 2009.

2. INFORMS Annual Meeting, San Diego, Oct. 11-14, 2009 (invited speaker to the Finance and Stochastics and Portfolio Credit Risk Sessions).
3. Rutgers University, Mathematical Finance and Probability Seminar, September 29, 2009.
4. Department of Risk Management and Insurance, Georgia State University, Quantitative Finance Seminar, August 28, 2009.
5. Stanford University, Department of Mathematics, Financial Mathematics Seminar, April 24, 2009.
6. Fields Institute Quantitative Finance Seminar (also visited McMaster University), April 2, 2009.
7. What is seminar, University of Michigan, March 24, 2009.
8. University of Southern California, Dept. of Mathematics, Mathematical Finance Colloquium. Feb 23, 2009.
9. Princeton University, Stochastic Analysis Seminar, 16th and 18th of February, 2009.
10. AMS Annual Meeting, Special Session on Financial Mathematics, Washington D.C., Jan. 7-8, 2009 (invited speaker).

## 2008

1. SIAM Conference on Financial Mathematics and Engineering, Rutgers, November 21-22, 2008 (invited speaker).
2. Probability Seminar, Columbia University, Department of Mathematics, November 14, 2008.
3. IFID/MITACS Conference on Financial Engineering for Actuarial Mathematics, Fields Institute, Toronto, November 9-10, 2008 (keynote speaker).
4. Workshop on Optimization and Optimal Control, Linz, Austria, October 20-24 2008.
5. Mathematics Seminar, Istanbul Center for Mathematical Sciences, May 2008.
6. Workshop in Memory of Professor Hayri Korezlioglu, Ankara, Turkey, April 2008 (keynote speaker).
7. Daiwa Young Researchers International Workshop, Kyoto University, March 2008 (keynote speaker).
8. Oberwolfach Workshop on Stochastic Analysis in Finance and Insurance, Germany, January 2008 (by invitation only event).
9. Annual AMS Meeting, San Diego, 2008 (invited speaker for the financial mathematics special session).

## 2007:

1. Fields Institute, Actuarial Science and Mathematical Finance Seminar, Toronto, November 2007.
2. Mathematics Colloquium, Illinois Institute of Technology, Chicago, November 2007.
3. Mathematics Colloquium, University of Texas at Austin, October 12, 2007.
4. The Fourth IASTED International Conference on Financial Engineering and Applications, Berkeley, CA, September 24-26, 2007 (invited speaker).
5. The 32nd Conference on Stochastic Processes and their Applications, Urbana-Champaign, August 2007 (invited speaker).
6. INFORMS International, Puerto Rico, July 2007 (invited speaker).
7. Kent-Purdue Minisymposium on Financial Mathematics, April 27-28, 2007 (invited speaker).
8. Statistics Colloquium, University of Michigan, March 23, 2007.
9. Syracuse University's Business School, Finance Colloquium, March 2, 2007.
10. Mathematics Colloquium, Bowling Green State University, February 23, 2007.

11. Financial Engineering Seminar, University of Florida, Dept. of Industrial Engineering, February 9, 2006.
12. Probability Seminar, Mathematical Sciences, Carnegie Mellon University, January 15, 2007
13. Annual AMS Meeting, January 5-8, 2007 (invited speaker).

**2006:**

1. Probability Seminar, Columbia University, Department of Mathematics, Dec. 15 2006.
2. Probability and Mathematical Finance Seminar, Carnegie Mellon University, Department of Mathematical Sciences, November 20, 2006.
3. Informs Annual Meeting, Pittsburgh, November 5-8, 2005 (invited speaker for the Financial Engineering Session).
4. SIAM Conference on Financial Mathematics and Engineering, July 9-12, Boston, invited speaker.
5. 21st European Conference on Operations Research in Reykjavik, Iceland, July 2-5 (invited speaker).
6. Operations Management Colloquium, University of Michigan, Stephen M. Ross School of Business, March 3, 2006.
7. Industrial Engineering and Operations Research Colloquium, University of California at Berkeley, Feb 24, 2006.
8. Industrial Engineering and Operations Research Colloquium, Columbia University, Feb 22, 2006.
9. Statistics Colloquium, University of California at Berkeley, February 7, 2006.
10. Mathematics Colloquium, Illinois Institute of Technology, January 30, 2006.
11. Statistics and Operations Research Colloquium, University of North Carolina at Chapel Hill, January 27, 2006.
12. Industrial Engineering Colloquium, Industrial and Enterprise Systems Engineering, University of Illinois at Urbana Champaign, January 23, 2006.
13. Applied Probability and Statistics Colloquium, University of California at Santa Barbara, January 20, 2006.

**2005:**

1. IEEE Conference on Decision and Control; European Control Conference ECC 2005, Seville, December 12-15 (invited speaker).
2. Industrial Engineering Special Seminar, Purdue University, December 6, 2005.
3. Informs Annual Meeting, San Francisco, November 13-16, 2005 (invited speaker for the Financial Engineering Session).
4. Financial/ Actuarial Mathematics Seminar, University of Michigan, Dept. of Mathematics, September 15, 2005.
5. 43th Annual Allerton Conference on Communication, Control, and Computing, Allerton, Illinois, September 28-30, 2005.
6. CMS Summer Meeting, Waterloo, CA, June, 2005 (invited speaker to the Mathematics of Actuarial Finance session).
7. Stochastic Analysis Seminar, Princeton University, March 30, 2005.
8. Financial/ Actuarial Mathematics Seminar, University of Michigan, Dept. of Mathematics, February 17, 2005.

**2004:**

1. Financial/ Actuarial Mathematics Seminar, University of Michigan, Dept. of Mathematics, November 4, 2004.
2. Informs Annual Meeting, Denver, October 24-27, 2004 (invited speaker for the Financial Engineering Session).

3. Third World Congress of the Bachelier Finance Society, Chicago, July 21-24, 2004.
4. 38th Annual Conference on Information Sciences and Systems, Princeton, March 2004.
5. Industrial and Systems Engineering Graduate Seminar, University of Florida, Dept. of Industrial Engineering, February 12, 2004.
6. Mathematics Colloquium, Florida State University, Dept. of Mathematics, Feb 02, 2004.

**2003:**

1. Fractional Brownian Days, Helsinki, Finland, September 26-27, 2003.
2. 29th Conference on Stochastic Processes and Their Applications, Angra dos Reis, Brazil, August 3 - 9, 2003.
3. Euro Informs Joint International Meeting, Istanbul, Turkey, July 6-10, 2003;
4. Eighth Viennese Workshop on Optimal Control, Dynamic Games and Nonlinear Dynamics, Vienna, May 14-16, 2003.

**Collaborators**

1. Bahman Angoshtari (My former post-doc, Term Assistant Professor University of Washington, Department of Applied Mathematics.)
2. Parsiad Azimzadeh (Ph.D. student, University of Waterloo).
3. Nicole Bäuerle (Professor, Karlsruhe Institute of Technology).
4. Amarjit Budhiraja (Professor and Chair, Department of Statistics, University of North Carolina at Chapel Hill).
5. Li Chen (Executive Director, JPMorgan Chase).
6. Asaf Cohen (My post-doc, University of Michigan, Department of Mathematics).
7. Andrea Cosso (Ricertore (Assistant Professor), Dipartimento di Matematica, Politecnico di Milano).
8. Alexander Cox (Senior Lecturer in Probability, University of Bath, Britain.)
9. Savas Dayanik (Associate Professor, Bilkent University (in Ankara, Turkey), Department of Industrial Engineering).
10. Yan Dolinsky (Senior Lecturer (Associate Professor), Hebrew University of Jerusalem, Department of Statistics).
11. Masahiko Egami (Professor, Kyoto University, Graduate School of Economics; Former post-doc, University of Michigan, 2005-2007).
12. Tom Emmerling (Senior Quantitative Risk Analyst at M&T Bank Corporation; my former post-doc.)
13. Arash Fahim (Assistant Professor; Department of Mathematics, Florida State University; my former post-doc.)
14. Georgios Fellouris (Assistant Professors; Department of Statistics, University of Illinois at Urbana-Champaign.)
15. Jun Geng (Associate Professor at Harbin Institute of Technology, China.)
16. Jia Guo (my Ph.D. student).
17. Ulrich Horst (Professor, Humboldt University of Berlin, Department of Mathematics.)
18. Xueying Hu (Vice President, Market risk modeling, Goldman Sachs; my former Ph.D student.)
19. Yu-Jui Huang (Tenure track Assistant Professor at the Department of Applied Mathematics, University of Colorado-Boulder; my former student.)
20. Ioannis Karatzas (Eugene Higgins Professor of Applied Probability, Columbia University, Department of Mathematics).
21. Kostas Kardaras (Professor, London School of Economics, Department of Statistics).
22. Christian Keller (My post-doc, University of Michigan, Department of Mathematics).

23. Ross Kravitz (Senior Data Scientist at Pandora; my former Ph.D. student.)
24. Andreas Kyprianou (Professor of Mathematical Sciences, University of Bath.)
25. George Labahn (Professor of Computer Science, University of Waterloo).
26. Lifeng Lai (Associate Professor, Electrical and Computer Engineering, UC Davis).
27. Jiaqi Li (Associate, Controller modeling, Goldman Sachs, my former Ph.D. student).
28. Zhibin Liang (Professor, School of Mathematical Sciences, Nanjing Normal University, China).
29. Mike Ludkovski (Professor, University of California at Santa Barbara, Department of Applied Probability and Statistics; Former post-doc, University of Michigan, 2005-2008).
30. Jose-Luis Menaldi (Professor, Wayne State University, Department of Mathematics).
31. Moshe Milevsky (Associate Professor, York University (Canada), Schulich School of Business).
32. Christopher W. Miller (Associate @ Goldman Sachs.)
33. Kristen Moore (Associate Professor, University of Michigan, Department of Mathematics).
34. Alexander Munk (Quant/Financial Engineer at Chicago Trading Company, my former Ph.D. student).
35. Sergey Nadtochiy (Assistant Professor, University of Michigan, Department of Mathematics).
36. Mikko Pakkanen (Lecturer, Department of Mathematics, Imperial College London).
37. Huy en Pham (Professor, Laboratoire de Probabilit es et Mod eles Al eatoires, Universit  Paris Diderot, and CREST-ENSAE).
38. H. Vincent Poor (Michael Henry Strater University Professor of Electrical Electrical Engineering, Princeton University, School of Engineering and Applied Science; U.S. National Academy of Sciences; National Academy of Engineering (NAE); a Fellow of the American Academy of Arts & Sciences; My Ph.D Advisor).
39. David Promislow (Emeritus Professor, York University (Canada), Department of Mathematics and Statistics).
40. Jinniao Qiu (Assistant Professor, University of Calgary, Department of Mathematics and Statistics; my former post-doc).
41. Raghuveer Rao (Army Research Lab).
42. Hasanjan Sayit (Senior Lecturer, Durham University, Department of Mathematics).
43. Semih Sezer (Associate Professor, Sabanci University (in Istanbul), Industrial Engineering; Former post-doc, University of Michigan, 2006-2008).
44. Mihai S rbu (Associate Professor, University of Texas at Austin, Department of Mathematics).
45. Ronnie Sircar (Professor, Princeton University, Department of Operations Research and Financial Engineering).
46. Qingshuo Song (Associate Professor, City University of Hong Kong, Department of Mathematics ; my former post-doc).
47. Yavor Stoev (My post-doc, Department of Mathematics, University of Michigan.)
48. Gu Wang (Assistant Professor WPI, Department of Mathematical Sciences; my former post-doc).
49. Hao Xing (Associate Professor, London School of Economics, Department of Statistics; my former Ph.D. student).
50. Kazutoshi Yamazaki (Associate Professor, Kansai University, Japan).
51. Bo Yang (Executive director, CVA (Counterparty Valuation Adjustment) desk strategist, Morgan Stanley; my former Ph.D. student).

52. Jie Yang, (Associate Professor, University of Illinois at Chicago, Department of Mathematics).
53. Song Yao (Associate Professor, Pittsburgh University, Department of Mathematics; my former post-doc, University of Michigan, Department of Mathematics).
54. Virginia R. Young (Nesbitt Professor, University of Michigan, Department of Mathematics).
55. Xiang Yu ( Assistant professor, The Hong Kong Polytechnic University, Department of Applied Mathematics; my former post-doc).
56. Yuchong Zhang (Post-doc assistant professor, Columbia University, Department of Statistics; my former Ph.D. student.)
57. Zhou Zhou (Post-doc at IMA, University of Minnesota; my former Ph.D. student.)