David Saunders

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Education

Honours B.A. (Applied Mathematics), McGill University, 1996.

M.Sc. (Mathematics), University of Toronto, 1997. Thesis Title: "Applications of Optimization in Mathematical Finance"

Ph.D. (Mathematics), University of Toronto, 2001. Thesis Title: "Mathematical Problems in the Theory of Incomplete Markets"

Employment

07/2011-present Associate Professor, Department of Statistics and Actuarial Science, University of Waterloo.

05/2005-06/2011 Assistant Professor, Department of Statistics and Actuarial Science, University of Waterloo.

08/2002-04/2005: Assistant Professor, Department of Mathematics, University of Pittsburgh.

09/2001-08/2002: Assistant Professor and CLR Chair in Corporate Finance, Cyprus International Institute of Management.

08/2000-07/2001: Research Associate, Quantitative Research Group, Algorithmics Inc.

Publications

Articles in Refereed Journals

1. Meng, F., Saunders, D., and Seco, L., 2018, "The Myth of Hedge Fund Fee Diversification", 22 pages, Forthcoming, Journal of Alternative Investments.

2. Hardy, M., Saunders, D., and Zhu, X., 2018, "Valuation of a Bermudan Defined Benefit Underpin Hybrid Pension Benefit", 35 pages, Forthcoming, Scandinavian Actuarial Journal.

3. Zhu, X., Hardy, M., and Saunders, D., 2018, "Liability Driven Dynamic Hedging Strategies for Cash Balance Pension Plans", 31 pages, Forthcoming, ASTIN Bulletin.

4. Hardy, M., Saunders, D., and Zhang, S., 2018, "Updating Wilkie's Economic Scenario Generator for U.S. Applications", 30 pages, Forthcoming, North American Actuarial Journal.

5. Saunders, D., Tsui, L.K., and Iyengar, S., 2018, "Lower Tail Independence of Hitting Times of Two-Dimensional Diffusions", 21 pages, Forthcoming, Probability in the Engineering and Informational Sciences.

6. Lin, H., Saunders, D., and Weng, C., 2017, "Optimal Investment Strategies for Participating Insurance Contracts", Insurance: Mathematics and Economics, 73, 137-155.

7. Hofert, M., Memartoluie, A., Saunders, D., and Wirjanto, T., 2017, "Improved Algorithms for Computing Worst Value-at-Risk", Statistics and Risk Modeling, 34(1-2), 13–31.

8. Memartoluie, A., Saunders, D., and Wirjanto, T., 2017, "Wrong-Way Risk Bounds in Counterparty Credit Risk Management", Journal of Risk Management in Financial Institutions, 10(2), 150-163.

9. Escobar, M., Krayzler, M., Ramsauer, F., Saunders, D., and Zagst, R., 2016, "Incorporation of Stochastic Policyholder Behavior in Analytical Pricing of GMABs and GMDBs", Risks, 4(4), 31 Pages.

10. Rosen, D., and Saunders, D., 2016, "Regress under Stress: A Simple Least-Squares Method for Integrating Economic Scenarios with Risk Simulations", Journal of Risk Management in Financial Institutions, 9(4), 391–412.

11. Hardy, M., Saunders, D., and Zhu, X., 2014, "Market-Consistent Valuation and Funding of Cash Balance Pensions", North American Actuarial Journal, 18(2), 294–314.

12. Escobar, M., Mitterreiter, M., Saunders, D., Seco, L., and Zagst, R., 2013, "Market Crises and the $1/N$ Asset Allocation Strategy", Journal of Investment Strategies, 2(4), 83–107.

13. Saunders, D., Seco, L., Vogt, C., and Zagst, R., 2013, "A Fund of Hedge Funds under Regime Switching", Journal of Alternative Investments, 15(4), 8–23.

14. Marshall, C., Hardy, M., and Saunders, D., 2012, "Measuring the Effectiveness of Static Hedging Strategies for a Guaranteed Minimum Income Benefit", North American Actuarial Journal, 16(2), 143–182.

15. Rosen, D., and Saunders, D., 2012, "CVA the Wrong Way", Journal of Risk Management in Financial Institutions, 5(3), 252–272.

16. Hernandez-Cortes, J., Saunders, D., and Seco, L., 2012, "Algorithmic Estimation of Risk Factors in Financial Markets with Stochastic Drift", Computers and Operations Research, 39(4), 820-828.

17. Chen, X., Cheng, L., Chadam, J., and Saunders, D., 2011, "Existence and Uniqueness of the Solution to the Inverse Boundary Crossing Problem for Diffusions". Annals of Applied Probability, 21(5), 1663-1693.

18. Nedeljkovic, J., Rosen, D., and Saunders, D., 2010, "Pricing and Hedging CLOs with Implied Factor Models", Journal of Credit Risk, 6(3), 53–97.

19. Garcia-Cespedes, J.C., de Juan Herrero, J.A., Rosen, D., and Saunders, D., 2010, "Effective Modelling of Wrong-Way Risk, CCR Capital and Alpha in Basel II", Journal of Risk Model Validation, 4(1), 71-98. Reproduced in a 2016 special issue of the Journal of Risk Model Valdiation containing the 10 most cited papers from the past 10 years.

20. Marshall, C., Hardy, M., and Saunders, D., 2010, "Valuation of a Guaranteed Minimum Income Benefit", North American Actuarial Journal, 14(1), 38-58.

21. Rosen, D., and Saunders, D., 2010, "Risk Contributions of Systematic Factors in Portfolio Credit Risk Models", Journal of Banking and Finance, 34(2), 336-349.

22. Saunders, D., 2009, "Pricing Timer Options under Fast Mean-Reverting Stochastic Volatility". Canadian Applied Mathematics Quarterly, 17(4), 737-753.

23. Rosen, D., and Saunders, D., 2009, "Valuing CDOs of Bespoke Portfolios with Implied Multi-Factor Models", Journal of Credit Risk, 5(3), 3-36.

24. Rosen, D., and Saunders, D., 2009, "Analytical Methods for Hedging Systematic Credit Risk with Linear Factor Portfolios", Journal of Economic Dynamics and Control, 33(1), 37-52.

25. Buckley, I., Saunders., D., and Seco, L., 2008, "Portfolio Optimization when Asset Returns Have the Gaussian Mixture Distribution", European Journal of Operational Research, 185(3), 1434-1461.

26. Saunders, D., Xiouros, C., and Zenios, S., 2007, "Credit Risk Optimization Using Factor Models", Annals of Operations Research, 152(1), 49-77.

27. Cheng, L., Chen, X., Chadam, J., and Saunders, D., 2006, "Analysis of an Inverse First Passage Problem from Risk Management", SIAM Journal on Mathematical Analysis, 38(3), 845-873.

28. Mausser, H., Saunders, D., and Seco, L., 2006, "Optimising Omega", Risk Magazine, November, 88-92.

29. Ermentrout, B., and Saunders, D., 2006, "Phase Resetting and Coupling of Noisy Neural Oscillators", Journal of Computational Neuroscience, 20(2), 179-190.

30. Consiglio, A., Saunders, D., and Zenios, S., 2006, "Asset and Liability Management for Insurance Products with Minimum Guarantees: The UK Case", Journal of Banking and Finance, 30(2), 645-667.

31. Nerouppos, M., Saunders, D., Xiourous, C., and Zenios, S., 2006, "Risk Management in Emerging Markets: Practical Methodologies and Empirical Tests", Multinational Finance Journal, 10(3/4), 179-221.

32. Consiglio, A., Saunders, D., and Zenios, S., 2003, "Insurance League: Italy vs. UK", Journal of Risk Finance, Summer, 47-54.

33. Dembo, R., Rosen, D., and Saunders, D., 2000, "Valuation in Incomplete Markets: An Optimization Approach", Algo Research Quarterly, 3(2), 29–37.

Articles in Books

1. Bhaduri, R., Djerroud, B., Meng, F., Saunders, D., Seco, L., and Shakourifar, M., 2018, "Fixed-Income Returns from Hedge Funds with Negative Fee Structures: Valuation and Risk Analysis", Forthcoming in Innovations in Insurance, Risk, and Asset Management, 17 pages.

2. Djerroud, B., Saunders, D., Seco, L., and Shakourifar, M., 2016, "Pricing Shared-Loss Hedge Fund Fee Structures", in *Innovations in Derivatives Markets: Fixed Income Modeling, Valuation Adjustments, Risk Management, and Regulation*, edited by K. Glau, Z. Grbac, M. Scherer, and R. Zagst, pages 369-383.

3. Rosen, D., and Saunders, D., 2014, "Re-Thinking CVA: Valuations, Counterparty Credit Risk, and Model Risk", in *Counterparty Credit Risk Management*, edited by E. Canabarro and M. Pykhtin, pages 183–227, Risk Books.

4. Nedeljkovic, J., Rosen, D., and Saunders, D., 2011, "Valuation of Structured Finance Products with Implied Factor Models", in Credit Risk Frontiers: Subprime Crisis, Pricing and Hedging, CVA, MBS, Ratings and Liquidity, edited by T. Bielecki, D. Brigo and F. Patras, John Wiley & Sons.

5. Rosen, D., and Saunders, D., 2011, "Credit Risk Contributions", in Credit Risk Frontiers: Subprime Crisis, Pricing and Hedging, CVA, MBS, Ratings and Liquidity, edited by T. Bielecki, D. Brigo, and F. Patras, John Wiley & Sons.

6. Rosen, D., and Saunders, D., 2010, "Computing and Stress Testing Counterparty Credit Risk Capital", in Counterparty Credit Risk, edited by E. Canabarro, RiskBooks, pages 245–292.

7. Rosen, D., and Saunders, D., 2010, "Economic Capital", Encyclopedia of Quantitative Finance, edited by R. Cont, John Wiley & Sons.

Articles Submitted to Refereed Journals

1. Chen, X., Saunders, D., and Chadam, J., 2018, "Analysis of an Optimal Stopping Problem Arising in Hedge Fund Investing", 27 pages, submitted to the European Journal of Applied Mathematics.

2. Lin, H., Saunders, D., and Weng, C., 2018, "Portfolio Optimization with Performance Ratios", 30 pages, submitted to the International Journal of Theoretical and Applied Finance.

3. MacKay, A., Boyle, P., Hardy, M., and Saunders, D., 2017, "Variable Payout Annuities: How Optimal are Optimal Solutions?", submitted to the North American Actuarial Journal.

Working Papers

1. Sharara, I., Hardy, M., and Saunders, D., 2010, "Regulatory Capital Standards for Property and Casualty Insurers Under the U.S., Canadian and Proposed Solvency II (Standard) Formulas", 38 pages.

2. Sharara, I., Hardy, M., and Saunders, D., 2009, "A Comparative Analysis of U.S., Canadian and Solvency II Capital Adequacy Requirements in Life Insurance", 35 pages. (This paper has also been made part of the study material for the Society of Actuaries' exam on Financial Economic Theory and Engineering (FETE), part of the FSA Requirements for the Finance/ERM and Investment Tracks).

3. Cheng, L., Chen, X., Chadam, J., and Saunders, D., 2010, "Numerical Computation of an Inverse Boundary-Crossing Problem", University of Pittsburgh Working Paper, 26 pages.

4. Rosen, D., Saunders, D., and Zhang, M., 2010, "Modelling the Incremental Risk Charge", Working Paper, 15 pages.

Monographs and Technical Reports

1. MacKay, A., Boyle, P., Hardy, M., and Saunders, D., 2015, "Optimal Investment Strategies at Retirement in the Presence of Group Self-Annuitization Schemes", 33 pages, Published by the Society of Actuaries.

2. Hardy, M.R., Saunders, D., and Zhu, X., 2013, "Market Consistent Valuation and Funding of Cash Balance Pensions", Society of Actuaries Technical Report, 49 pages.

3. Saunders, D., Xiouros, C., and Zenios, S., 2002, "Measuring Portfolio Credit Risk for a Cypriot Commercial Bank". Working Paper 02-11, HERMES European Center of Excellence on Computational Finance and Economics, University of Cyprus, 101 pages.

4. Nerouppos, M., Saunders, D., Xiouros, C., and Zenios, S., 2002, "The Risks of the Cyprus and Athens Stock Exchanges". Working Paper 02-05, HERMES European Center of Excellence on Computational Finance and Economics, University of Cyprus, 2002, (83 pages). (A study published by HERMES European Center of Excellence on Computational Finance and Economics and presented at an open forum on the Cyprus stock exchange bubble, followed by speeches in response by the Cypriot Minister of Finance, Chairman of the Cypriot Securities and Exchange Commission, Chairman of the Cyprus Stock Exchange, and a member of the Cypriot Parliament).

Awards

1. PBSS Colloquium, Best Paper Award (Pension and Social Security Section), June 8, 2017 (for "Valuation of a Bermudan-DB-Underpin Options", with M. Hardy and X. Zhu).
2. International Actuarial Association, Pension Benefits and Social Security Section, Best Paper Award for 2013 (for "Market Consistent Valuation of Cash Balance Liabilities", with M. Hardy and X. Zhu).
3. AFIR/ERM PBSS LIFE Colloquium, Best Paper Award (Pension and Social Security Section), July 3, 2013 (for "Market Consistent Valuation of Cash Balance Liabilities", with M. Hardy and X. Zhu).
4. Society of Actuaries, Committee on Knowledge Extension Research Grant, "Pension Plan Design and Risk Management" (joint with M. Hardy).
5. Natural Sciences and Engineering Research Council of Canada, Discovery Grant 312618 (5/1/12-5/1/17).
6. Enterprise Risk Management (ERM) Symposium (2009), PRMIA Award for New Frontiers in Risk Management (joint with D. Rosen).
7. Society of Actuaries, Committee on Knowledge Extension Research Grant, "Pricing and Hedging Insurance Contracts with Embedded Options" (joint with M. Hardy and C. Marshall), 2009-2010.
8. Society of Actuaries, Committee on Knowledge Extension Research Grant, "A Study of International Solvency Regimes" (joint with M. Hardy and I. Sharara), 2009-2010.
9. Natural Sciences and Engineering Research Council of Canada, Discovery Grant 312618 (9/1/07-9/1/12).
10. Natural Sciences and Engineering Research Council of Canada, Discovery Grant 312618 (9/1/05-9/1/07).
11. University of Waterloo, Learning Initiative Fund Grant (with K. Freeland and H. Panjer), (9/1/06-12/1/07).
12. National Science Foundation, award DMS-0310656. (8/1/03-4/40/05).
13. University of Pittsburgh, Central Research Development Fund, Small Grant. (7/1/03-6/30/05).
14. University of Pittsburgh, Faculty of Arts and Sciences, Internal Research Grant (declined, 2003).
15. Natural Sciences and Engineering Research Council of Canada, Postdoctoral Fellowship (declined, 2001).
16. Malcolm Slingsby Robertson Award for excellence in graduate research, University of Toronto (2001).
17. Ontario Graduate Scholarship in Science and Technology (2000-2001).
18. Natural Sciences and Engineering Research Council of Canada, Industrial Postgraduate Scholarship (1998-2000).
19. Natural Sciences and Engineering Research Council of Canada, Industrial Postgraduate Scholarship (1996-1998).
20. McGill University, Memorial Award for Excellence in Applied Mathematics (1996).

Research Fellowships

1. Member, Waterloo Research Institute in Insurance, Securities & Quantitative Finance, University of Waterloo, 2009-present.
2. Member, University of Waterloo Institute for Quantitative Finance and Insurance, 2005-2009.
3. Member, University of Waterloo Institute of Insurance and Pension Research, 2005-2009.
4. Member, University of Waterloo Teaching Based Research Group, August 2006-present.
5. Research Fellow: HERMES European Center of Excellence on Computational Finance and Economics, University of Cyprus. September 2001 - present.

Conference Talks

1. “Mean-Risk Portfolio Selection with Expectiles and the Omega Performance Measure", CAIMS Annual Meeting, Ryerson University, June 5, 2018.
2. “Optimal Investment Strategies for Participating Contracts using the Martingale Method", Contributed Talk, 21st International Congress on Insurance: Mathematics and Economics, Vienna, July 3, 2017.
3. “Application of the Martingale Approach to Stochastic Control to Performance Ratio Maximization", Invited Talk, TIANFU International Conference on Partial Differential Equations, Southwestern University of Finance and Economics, June 18, 2017.
4. “Two Applications of the Martingale Method to Stochastic Control Problems in Finance and Insurance", Keynote Address, Conference on Innovations in Insurance, Risk, and Asset Management, Technical University of Munich, Munich, April 5, 2017.
5. “Stress Tests Integrating Economic Scenarios and Simulations", MMF Symposium, Invited Talk, Blue Mountain, January 21, 2017.
6. “Risk Measure Bounds for Portfolios with Given Marginals: Applications to Counterparty Credit Risk", Canadian Operational Research Society Annual Meeting, Banff, May 31, 2016.
7. “Integrating Economic Scenarios with Risk Simulations", Global Risk Institute, Toronto, April 21, 2016.
8. “Mathematical Analysis of Shared-Loss Fee Structures for Hedge Funds", Probability/Mathematical Finance Seminar, Carnegie Mellon University, March 21, 2016.
9. “Here be Options: Insights on Hybrid Pensions from Mathematical Finance", MMF Symposium, Invited Talk, Blue Mountain, February 6, 2016.
10. “An Optimal Stopping Problem Arising in Hedge Fund Investing", Ryerson University Department of Mathematics Colloquium, November 19, 2015.
11. “Shared Loss Fee Structures for Hedge Funds", Industrial-Academic Workshop on Optimization in Finance and Risk Management, Fields Institute, October 6, 2015 (Invited Talk).
12. “Lower Tail Independence of Hitting Times of Two-Dimensional Diffusion Processes", Contributed Talk, Statistical Society of Canada Meeting, June 15, 2015.

13. “First-Loss Fee Structures for Hedge Funds", Mathematical Finance Seminar, University of Pittsburgh, February 18, 2015.
14. “Lower Tail Independence of Diffusion Hitting Times", Canadian Mathematical Society Annual Meeting, Hamilton, December 7, 2014.
15. “Mathematical Models for Counterparty Credit Risk", Short Course, Statistical Society of Canada Annual Meeting, Edmonton, May 26, 2013.
16. “Derivatives Pricing and Risk Measurement under Model Uncertainty", Advances in Nonlinear Science, Pittsburgh, March 15, 2013.
17. “Portfolio Selection and Regime Switching Models", Mathematical Finance Seminar, University of Pittsburgh, January 18, 2013.
18. “CVA and Wrong-Way Risk", CAIMS Annual Meeting, June 25, 2012.
19. “Recent Advances in Risk Measurement for Structured Finance Products", RiskMinds USA, Boston, June 6, 2012.
20. “Economic and Regulatory CCR Capital", PRMIA Global Risk Conference, New York, May 14, 2012.
21. “Credit Risk Capital in the Trading Book: Model Uncertainty and Computational Efficiency", Financial Mathematics Seminar, University of Pittsburgh, March 16, 2012.
22. “Mathematical and Computational Issues in Calculating Capital for Credit Risk", Second Quebec-Ontario Workshop on Insurance Mathematics, Fields Institute, Toronto, February 3, 2012.
23. “Counterparty Credit Risk Captial", ICBI RiskMinds Conference, Geneva, December 9, 2011.
24. “Efficient Calculation of Economic and Regulatory Capital for Structured Credit Instruments", Invited Talk, ICBI RiskMinds Conference, Geneva, December 7, 2011.
25. “Estimation Error, Bayesian Portfolio Selection and Implied Views", Statistics 2011 Canada, IMST 2011-FIM, Concordia University, Montreal, July 4, 2011.
26. "Credit Valuation Adjustment", Invited Talk, ICBI RiskMinds USA Conference, June 17, 2011.
27. "CVA, Wrong-Way Risk and Basel III", Invited Talk, ICBI RiskMinds USA Conference, Boston, June 15, 2011.
28. “Modelling Counterparty Credit Exposures", Invited Talk, IAFE Annual Conference, New York, May 16, 2011.
29. “Pricing Structured Credit Products with Implied Factor Models", SIAM Annual Meeting, Pittsburgh, July 12, 2010.
30. “Pricing Counterparty Credit Risk: Credit Value Adjustment", Invited Talk, ICBI RiskMinds USA Conference, Boston, May 13, 2010.
31. “Practical Modelling of the Incremental Risk Charge", Invited Talk, ICBI RiskMinds USA Conference, Boston, May 12, 2010.
32. “Pricing Counterparty Credit Risk: Credit Valuation Adjustment” Invited Talk, ICBI RiskMinds Conference, Geneva, December 11, 2009.
33. “Pricing and Hedging CLOs with Implied Factor Models”, Invited Talk, Conference on Recent Advancements in the Theory and Practice of Credit Derivatives, Nice, September 30, 2009.

34. "Practical Modelling of the Incremental Risk Charge (IRC) in the Trading Book", Invited Talk, ICBI RiskCapital Conference, Brussels, July 2, 2009.

35. "Non-Linear Risk Contributions and Credit Risk Models", Canadian Applied and Industrial Mathematics Society Meeting, Invited Talk, June, 12, 2009.

36. "Factor Risk Contributions in Portfolio Credit Risk Models", ERM Symposium, Chicago, April 30, 2009.

37. "Valuation of Structured Credit Portfolios: Beyond the Crisis", (joint with D. Rosen), IAFE Seminar, New York, January 22, 2009.

38. "Key Issues in the Basel II Treatment of Credit Risk in the Trading Book", Invited Talk, ICBI RiskMinds Conference, Geneva, December 12, 2008.

39. "Direct and Inverse Boundary Crossing Problems for Diffusions: PDEs and Integral Equations", Invited Talk, SIAM Conference on Financial Math and Engineering, Rutgers, NJ, November 21, 2008.

40. "Modeling Bespoke CDO Portfolios and Structured Credit Products: A Scenario Approach", (joint with D. Rosen), University of Waterloo Financial Math Seminar, New York, November 11, 2008.

41. "Risk Analysis of Portfolio Transactions", Risk Training, Concentration Risk, New York, September 16, 2008.

42. "Credit Crises and Risk Contributions", Colloquium, Department of Mathematics, University of Pittsburgh, August 29, 2008.

43. "Counterparty Credit Risk Overview" & "Economic and Regulatory Credit Risk Capital", Risk Training, Counterparty Credit Risk Management, London, April 21, 2008.

44. "Subprimes and Supersolutions", Mathematics Department Colloquium, Ryerson University, February 7, 2008.

45. "Risk Contributions of Systematic Factors in Multi-Factor Credit Risk Models". Invited Talk, Canadian Mathematical Society Winter Meeting, London, Ontario, December 12, 2007.

46. "Valuing Guaranteed Minimum Income Benefits Offered in Practice", Contributed Talk, 42nd Actuarial Research Conference, Robert Morris University, Pittsburgh, August 9, 2007 (winner of third prize for presentation by a non-graduate student).

47. "Pricing CDO Tranches of Bespoke Portfolios", Fields Institute Quantitative Finance Seminar, Toronto, March 28, 2007.

48. "Pricing CDO Tranches of Bespoke Portfolios", Carnegie Mellon University Probability and Mathematical Finance Seminar, March 19, 2007.

49. "Factor Contributions and Hedging of Systemic Risk in Multi-Factor Credit Portfolio Models" Contributed talk. Fourth Portuguese Finance Network Conference, July 7, 2006, Porto, Portugal.

50. "Recent Developments in Structural Credit Risk Modelling: Optimal Portfolios and Inverse Problems" Invited talk, AIMS/Phimac Seminar, McMaster University, November 15, 2005.

51. "Small Time Behavior of the Critical Stock Price for the American Put on Alternative Stochastic Processes", Contributed Talk. Sixth World Congress of the Bernoulli Society for Mathematical Statistics and Probability. July 28, 2004, Barcelona, Spain.

52. "Asymptotic Analysis of the Critical Stock Price for American Options on Alternative Stochastic Processes", Contributed Talk. Third International Congress of the Bachelier Finance Society, July 22, 2004.

53. "Asymptotic Analysis of the Critical Stock Price for the American Put on Alternative Stochastic Processes", Invited Talk. American Mathematical Society Sectional Meeting, March 27, 2004, Athens, Ohio.

54. "Stochastic Programming Models for Insurance Products with Guarantees", Invited Talk. EURO-INFORMS joint international meeting, July, 2003, Istanbul, Turkey.

55. "Asymptotic Theory for Optimal Credit Portfolios", Colloquium. Department of Mathematics, Ohio University, April, 2003.

56. "Structural Integrity: New Results on Credit Risk Modelling", Departmental Seminar, Department of Statistics and Actuarial Science, University of Waterloo, April, 2003.

57. "New Results on Asset and Liability Management for Insurance Products with Guarantees", Invited Talk. International Conference on Modeling, Risk Management and Optimization. Hosted by the Center for Risk Management and Financial Engineering, University of Florida, March, 2003.

58. "Optimal Structuring of Portfolios for Insurance Products with Minimum Guarantees", Invited Talk. Winter Meeting of the Canadian Mathematical Society, Ottawa, December 2002.

59. "Stochastic Programming for Insurance Products with Minimum Guarantees", Contributed Talk. International Congress on Insurance: Mathematics and Economics, Lisbon, Portugal, July, 2002.

60. "Asset and Liability Management for Minimum Guarantee Insurance Products: The UK Case". Invited Talk. IFORS Meeting, Edinburgh, Scotland, July 2002.

61. "Asset and Liability Management for Insurance Products with Minimum Guarantees: A Comparative Study", Contributed Talk. Second International Congress of the Bachelier Finance Society, Crete, June, 2002.

62. "Utility Invariant Derivatives Pricing", Invited Talk. SIAM International Meeting, San Diego, July, 2001.

63. "Pricing in Incomplete Markets: An Optimization Approach", Invited Talk. Conference on Asset and Liability Management From Institutions to Households, hosted by the University of Cyprus, May, 2001.

64. "Estimation of Stochastic Volatility Models". Mathematics Department Colloquium, University of Pittsburgh, March 2001.

65. "Optimization Duality and Derivatives Pricing in Incomplete Markets". Colloquium, Cyprus International Institute of Management, March, 2001.

66. "Implied Scenario Probabilities". Invited Talk. SIAM International meeting, Toronto, July 1998.

Teaching

1. "Counterparty Credit Risk and CVA", course given at TGI Financial Services, Tokyo, October 20-21, 2011.

2. "Stress Testing", course given at the National University of Singapore, October 19, 2011.

3. "Counterparty Credit Risk and CVA", course given at the National University of Singapore, October 17-18, 2011.
4. "Credit Portfolio Management" and "Stress Testing" courses given to industry practitioners at the Azerbaijan Central Bank Training Centre, Feb. 21-24, 2011.
5. "Credit Portfolio Management", course given to industry practitioners at the Risk Management Institute of the National University of Singapore, Sept. 22-23, 2010.
6. "Stress Testing", course given to industry practitioners at the Risk Management Institute of the National University of Singapore, Sept. 20-21, 2010.
7. Course Instructor: Financial Mathematics 2 (Winter 2011, Winter 2012), Applied Statistics (Winter 2012), Masters in Actuarial Science course at the University of Waterloo.
8. Course Instructor: Corporate Finance 1 (Spring 2005, Winter 2006, Fall 2006, Fall 2007), Corporate Finance 2 (Winter 2006), Finance One (Graduate course, Fall 2006, Fall 2007, Fall 2008), Finance Three (Graduate course, Fall, 2008, Fall 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2013), Computer Intensive Methods for Stochastic Models in Finance (Fall 2013). Asset-Liability Management (Fall, 2009). Courses taught at the University of Waterloo.
9. Course Instructor: "Robust Estimation and Portfolio Optimization", short course given to students of the National University of Singapore visiting the University of Waterloo, June 23, 2009, June 15, 2010, June 21, 2011.
10. Course Instructor: "Modelling and Management of Economic Capital", Toronto, March 6-7, 2008 (short course given to participants from the finance and insurance industries).
11. Course Instructor: "Discrete Hedging and Portfolio Optimization", short course given to students of the National University of Singapore visiting the University of Waterloo, July 11, 2007.
12. Course Instructor: Mathematical Finance 1 (Fall 2002), Mathematical Finance 2 (Winter 2003, 2004), Mathematical Finance 3 (Fall 2003, Fall 2004), Mathematical Finance 4 (Winter 2004, 2005). Designed and taught mathematics graduate courses at the University of Pittsburgh.
13. Course Instructor: Ordinary Differential Equations: Third year undergraduate course at the University of Pittsburgh (Fall, 2003)
14. Course Instructor: Business Calculus. First year undergraduate course at the University of Pittsburgh. (Fall 2002).
15. Course Instructor: Risk Management. Taught course to MBA students at the Cyprus International Institute of Management. (Spring 2002).
16. Course Instructor: Business Statistics. Taught course to MBA students at the Cyprus International Institute of Management (Fall 2001, Winter 2002).

Academic Advising

Ph.D. Thesis Supervision

1. F. Meng, Statistics and Actuarial Science, University of Waterloo, expected completion date: 2018.
2. H. Lin, Statistics and Actuarial Science, University of Waterloo, jointly supervised with C. Weng, expected completion date: 2018.

3. S. Zhang, Statistics and Actuarial Science, University of Waterloo, "Economic Scenario Generation for Pension Fund Management", jointly supervised with M. Hardy, expected completion date: 2017.
4. A. Memartoluie, Computer Science, University of Waterloo, "Computational Methods in Counterparty Credit Risk", jointly supervised with T. Wirjanto, expected completion date: Spring 2015.
5. C. Marshall, Statistics and Actuarial Science, University of Waterloo, "Valuing Guaranteed Minimum Income Benefit Riders", jointly supervised with M. Hardy, completed August, 2011.
6. I. Sharara, Statistics and Actuarial Science, University of Waterloo, "New Solvency Regimes for Insurance Companies", jointly supervised with M. Hardy, completed February 2011.

M.Math Thesis Supervision

1. T. Kong, Statistics and Actuarial Science, University of Waterloo, jointly supervised with A. Kolkiewicz, expected completion date: May 2015.
2. X. Zhu, Statistics and Actuarial Science, University of Waterloo, "Market Consistent Valuation and Hedging of Pension Fund Liabilities", Jointly supervised with M. Hardy, expected completion date: August 2015.
3. L. Belisle, Statistics and Actuarial Science, University of Waterloo, "Static and Dynamic Modelling of Credit Default Risk: Tails, Moments, and Calibration", completed September 2014.
4. F. Ramsauer, M.Sc., Technische Universität München, "Pricing of Variable Annuities: Incorporation of Policyholder Behavior", jointly supervised with M. Escobar and R. Zagst, completed April 2013.
5. M. Mitterreiter, M.Sc., Technische Universität München, "Market Crises and the 1/n Asset Allocation Strategy", jointly supervised with M. Escobar, L. Seco and R. Zagst, completed August 2012.
6. K. Bhowmick, Statistics and Actuarial Science, University of Waterloo, "Inverse Problems in Portfolio Selection", completed September 2011.
7. C. Vogt, M.Sc., Technische Universität München, "Asset Allocation under Mixture Models" (Jointly supervised with L. Seco and R. Zagst, completed October 2010.
8. C. Marshall, Statistics and Actuarial Science, University of Waterloo, "Valuing Guaranteed Minimum Income Benefit Riders", jointly supervised with M. Hardy, completed August 2007.

M.Math Project Supervision

1. **2013:** Y. Hou, S. Shan, C. Silnieks, **2012:** D. Chen, R. Chen, K. Moshksar, **2011:** X. Yao, **2010:** Y. Hou, L. Xiao, **2008:** S. Mahajan, C. Tam, **2007:** E. Cheung, Z. Jin, D. Lee, W. Sun, S. Young, **2006:** Y. Bi, L. Ma.

Other Academic Advising

1. Undergraduate research supervision at the University of Waterloo, **2013:** N. MacGillivray, X. Zhu, X. Liu, **2012:** H. Chen, K. Jin, L. Song, **2009:** B. Ji.
2. K. Tsui, MITACS NCE Postdoctoral Fellow, "Mathematical Methods for Pricing and Hedging Credit Derivative Securities", University of Waterloo, 2011-2012.
3. Academic Supervisor for MITACS Accelerate Internships for W. Sun and D. Zhou (summer 2010 internships with R^2 Financial Technologies.

4. Ph.D Thesis Committee Member: **A. MacKay** (Statistics and Actuarial Science, University of Waterloo, completed 2014), **Z. Cui** (Statistics and Actuarial Science, University of Waterloo, completed 2013), **C. Qiu** (Statistics and Actuarial Science, University of Waterloo, 2012), **Z. Men** (Statistics and Actuarial Science, University of Waterloo, completed 2012), **B. Aoun** (Statistics and Actuarial Science, University of Waterloo, completed 2012), **L. Cheng** (Mathematics, University of Pittsburgh, 2005), **A. Domokos** (Mathematics, University of Pittsburgh, 2004).

5. Principal investigator and supervisor of undergraduate intern K. Morrison, University of Waterloo Learning Initiatives Fund Grant ($12,000 for undergraduate student salary), "Development of an Online Learning Centre for Foundational Courses in Actuarial Science", September-December 2006.

6. Supervised six projects in the course "Projects in Mathematical Finance" at the University of Pittsburgh, from Sept. 2002-2005. Student research joint with industrial collaborators.

7. University of Pittsburgh, Department of Mathematics Ph.D. Comprehensive examiner for three students (mathematical finance and stochastic processes, 2002-2004).

8. Supervised Independent Study Courses for two students on measure theory and probability theory, University of Pittsburgh (2003-2004 academic year).

9. Faculty advisor for C. Copeland, undergraduate summer internship at Best Buy Inc. Summer, 2004.

Editorial Work

1. Co-Editor (with M. Grasselli and S. Tompaidis), special issue of the International Journal of Theoretical and Applied Finance on Derivatives Pricing and Computational Methods in Finance, volume 14, number 3, May 2011.

2. Co-Editor (with S. Zenios) European Journal of Operational Research, feature cluster on Operational Research in Risk Management (Volume 185, Issue 3, 2008).

3. Associate Editor of Multinational Finance Journal, 2002-2005.

4. Referee for: i) Annals of Actuarial Science, ii) Annals of Operations Research, iii) Applied Stochastic Models in Business and Industry, iv) Asia Pacific Management Review, v) Bachelier Finance Society Congress, vi) Canadian Applied Mathematics Quarterly, vii) Decisions in Economics and Finance, viii) Discrete and Continuous Dynamical Systems (B), ix) European Journal of Applied Mathematics, x) European Journal of Operational Research, xi) Finance and Stochastics, xii) Insurance: Mathematics and Economics, xiii) International Journal of Computer Mathematics, xiv) International Journal of Finance and Economics, xv) International Journal of Management Science and Engineering Management, xvi) International Journal of Production Economics, xvii) International Journal of Risk Assessment and Management, xviii) International Journal of Theoretical and Applied Finance, xix) International Symposium on Management, Engineering and Informatics, xx) Journal of Applied Mathematics and Decision Sciences, xxi) Journal of Banking and Finance, xxii) Journal of Computational Finance, xxiii) Journal of Credit Risk, xxiv) Journal of Economic Dynamics and Control, xxv) Mathematical Reviews, xxvi) MITACS (Mathematics of Information Technology and Complex Systems), xxvii) Multinational Finance Journal, xxviii) National Science Foundation, xxix) Natural Sciences and Engineering Research Council of Canada (Discovery Grants Program), xxx) North American Actuarial Journal, xxxi) Quantitative Finance, xxxii) Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales, Serie A. Matemáticas, xxxiii) Risk, xxxiv) Statistics and Probability Letters, xxxv) University of Cyprus (internal grants program) .

Conference Organization

1. Canadian Operational Research Society Annual Meeting, Session Organizer, Session on Operations Research in Quantitative Risk Management, Ottawa, May 25-28, 2014.
2. SIAM National Meeting, Minisymposium on Advances in Quantitative Risk Management and Derivatives Pricing Since the Crisis, July 2010, University of Pittsburgh (with D. Rosen).
3. Member, Organizing Committee, Fields Institute Workshop on Computational Methods in Finance, Fields Institute, Toronto, March 22-24, 2010
4. Member, Organizing Committee, Risk Management and Insurance Conference, University of Waterloo, June 16, 2007.
5. American Mathematical Society Sectional Meeting, special session on Mathematical Finance. November 6-7, 2004, University of Pittsburgh (with J. Chadam).
6. Second RiskLab International Conference. July 4, 2002, Nicosia, Cyprus (co-organizer with S. Zenios).

Administration and Academic Leadership

1. Associate Chair (Actuarial Science), Department of Statistics and Actuarial Science, University of Waterloo, July 1, 2011 - June 30, 2014.
2. Faculty Advisor, University of Waterloo Master's in Quantitative Finance, 2006-2009.
3. Comprehensive Exam Committee Member, Department of Statistics and Actuarial Science, University of Waterloo, 2008-2011.
4. Computing Committee Member, Department of Statistics and Actuarial Science, University of Waterloo, 2006-2008.
5. Member, Committee Investigating Computational Content of Actuarial Science Courses, Department of Statistics and Actuarial Science, University of Waterloo, 2007.
6. Co-Director, Professional Science Masters in Mathematical Finance, University of Pittsburgh, 2004-2005.
7. Graduate Committee Member, Department of Mathematics, University of Pittsburgh (2003-2005).
8. Committee Member, Committee to Review Grading Policy for Multi-Section Courses, Department of Mathematics, University of Pittsburgh, 2003.
9. Deputy Director, RiskLab Cyprus (research laboratory on computational finance; jointly sponsored by the University of Cyprus and the Cyprus International Institute of Management) Sept 2001-August 2002.
10. Academic Committee Member, Cyprus International Institute of Management (2001-2002).

Consulting Activities

1. "Systematic Risk Measurement and Stress Testing", Work done with R^2 Financial Technologies for a national bank.
2. "Counterparty Credit Risk and Wrong-Way Risk", Work done with R^2 Financial Technologies for a large European Bank, 2012-2013.
3. "CVA Capital Calculation", Work done with R^2 Financial Technologies for a large European Bank, 2010-2011.
4. "Calculating and Stress Testing the Incremental Risk Charge". Work done with R^2 Financial Technologies for a large European Bank, 2009.
5. "Incremental Default Risk Review". Work done with R^2 Financial Technologies for a large North American bank, 2008.
6. "Counterparty Credit Risk and Alpha Calculation". Work done with R^2 Financial Technologies for a large Asian bank, 2008.
7. "Counterparty Credit Risk Capital in the Trading Book". Work done with R^2 Financial Technologies, for a large European bank, 2008.
8. "Comparative Pricing of Bespoke CDO Tranches Based on Index Quotes". Work done with R^2 Financial Technologies, for a major consulting firm and its client institution, 2007.
9. "Portfolio Credit Risk and Regulatory Capital Calculation". Work done with R^2 Financial Technologies, for a large European bank, 2006-2008.
10. "Pricing Bespoke CDO Tranches". Work done with R^2 Financial Technologies, for Algorithmics Inc., a Fitch Company, 2006.
11. PRMIA (Professional Risk Managers' International Association) Risk Management Course Instructor (one of four), Fields Institute, Toronto (four course offerings, Winter and Fall, 2006, Winter 2007, Fall 2008, Fall 2010, Fall 2011.
12. "The Risks of the Cyprus and Athens Stock Exchange" (with M. Nerouppos, C. Xiouros and S. Zenios), work done for the Cyprus Development Bank, 2002.
13. "Credit Risk Analysis for a Cypriot Commercial Bank" (with C. Xiouros and S. Zenios), work done for the Cyprus Development Bank, 2002.
14. "Forward Curves: Estimation and Sensitivity Analysis" (with L. Seco and A. de los Santos). Work done for Ontario Teachers' Pension Plan Board, 2000-2001.