Curriculum Vitae

LEONARD C. MACLEAN

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Education:

1976 Dalhousie University, Ph.D., Mathematics.
Doctoral Thesis: "Optimal Economic Growth"

1972 Dalhousie University, M.A., Mathematics.
Masters Thesis: "Noncooperative Bimatrix Games"

1965 St. Francis Xavier University, B.Ed.

1964 St. Francis Xavier University, B.A., Mathematics
Bachelors Thesis: "Number Theory"

Relevant Experience:

Current **Professor Emeritus, Rowe School of Business, Dalhousie University**

Editor, World Scientific Series in Finance

Editor, World Scientific Handbooks in Financial Economics Series

Editor, Quantitative Finance Letters

1976 - 2009 **Professor, School of Business Administration, Dalhousie University**

Professor, Dept of Community Health and Epidemiology

June,2008 – July, 2008 **Visiting Professor, Department of Mathematics and Statistics, University of Bergamo, Bergamo, Italy**
Taught course "Topics in Quantitative Finance" to PhD students

Apr, 2004 – July, 2004 **Visiting Fellow, Judge Institute of Management Studies Cambridge University, UK**
Taught course "Investments" to MBA students

1999, 2000 (June) **Visiting Professor, Royal Roads University, Victoria, BC**
Taught a concentrated course in Operations Management to undergraduate business students.

1995-1997 **Visiting Professor, Faculty of Commerce and Business Administration, UBC.**
On leave from Dalhousie University. Working with Dr. W.T. Ziemba (UBC) and Dr. A. Richman (AlgoPlus).

1989-1995 **Director, School of Business Administration, Dalhousie University.**
I was Director of the School at a most challenging time. The university system in NS was under review, with a goal of rationalization. It was proposed that the Dalhousie School of Business Administration be transferred to St. Mary's University. Through the involvement of stakeholders, this rationalization was avoided. In the process, we developed successful program initiatives such as the B. Comm. (Co-op), the minors in Business in the B.A. and B.Sc. programs, and the 10-month MBA. A Ph.D. proposal was also brought to Senate, but since the Nova Scotia government was not approving any new programs at that time, approval of the proposal by Dalhousie was deferred.

1984-1985 **Director of Health Services Research Unit, Department of Community Health and Epidemiology, Dalhousie University.**
Worked with a small group (M. Brown, P. Ruderman, & L. MacLean) on health utilization issues in Nova Scotia.

1983 **Visiting Professor, Faculty of Commerce and Business Administration, University of British Columbia, Vancouver, BC.**
On sabbatical leave from Dalhousie University. Started working with Dr W. Ziemba on capital growth models in finance.

1982 **Visiting Professor, Department of Business Studies, University of Zimbabwe, Harare, Zimbabwe.**
On secondment to the University of Zimbabwe, with funding from CIDA. Dalhousie subsequently received 10 years of CIDA funding for a university linkage program, with the objective of capacity building.

1980 **Visiting Professor, Department of Mathematics and Statistics, Simon Fraser University, Burnaby, BC.**
Spent the summer term working with Dr. L. Weldon on statistical estimation problems.

1972 –1975 **National Health Fellow, Department of Preventive Medicine, Dalhousie University.**
Supported by a grant from National Health and Welfare, I studied and carried out research into health services in Nova Scotia.

Teaching

I have successfully taught statistics and operations in a variety of programs and institutions. In 1989, I was selected as Professor of the Year by MBA students. My usual teaching load is 5 classes, with approximately 250 students in total. I have taught the following classes over the past decade.

I **Undergraduate Commerce**
Statistics for Business and Economics I and II
Operations Research
Operations and Logistics Management

II **Undergraduate Mathematics**
Introduction to Statistics

III **Undergraduate Medicine**
Statistics for Medicine

IV **Graduate Business**
Quantitative Decision Analysis
Operations Research
Advanced Operations Research
Applied Multivariate Analysis
Linear Statistical Models
Time Series Analysis
Investments

V **Graduate Medical Science**
Biostatistics

VI **Thesis Examiner**
Guangyi Chen: MDE (Dalhousie U., 1998)
Claude DesRochers: Ph.D (TUNS, 1997) – external examiner
Vincent Richman: Ph.D (Columbia U, 1996)- external examiner
JunJun Yi: Ph.D. (Dalhousie U., 1989)

Eileen Cormier: M.Sc. (Dalhousie U., 1985)
Bechara Toulany: M.Sc. (Dalhousie U., 1978)

Research

Publications:
I - Books

1. MacLean, L., Thorp, E. and Ziemba, W. (2010). *The Kelly Capital Growth Investment Criterion: Theory and Practice*. World Scientific, Singapore**.**

2. MacLean, L.C., Ziemba, W.T. (2012) *Handbook of the Fundamentals of Financial Decision Making. Vol I.* World Scientific Publishing Co, Singapore.

3. MacLean, L.C., Ziemba, W.T. (2013) *Handbook of the Fundamentals of Financial Decision Making. Vol II.* World Scientific Publishing Co, Singapore.

4. MacLean, L.C., Ziemba, W.T. (2016) *Problems in Portfolio Theory and Financial Decision Making.* World Scientific Publishing Co, Singapore.

5. Ziemba, W. T. and MacLean, L. C. (2018). *Dr Z's NFL Guidebook.* World Scientific Publishing Co, Singapore.

6. Foster, M. E., MacLean, L. C. (2020) *Quantitative Methods in Risk Analysis: A Practitioners Guide*. World Scientific, Singapore (Manuscript in draft).

7. MacLean, L. C. and W.T. Ziemba (2021). *Sports Analytics*. World Scientific Publishing Co, Singapore.

8. MacLean, L. C. and W.T. Ziemba (2022). *The Greatest Performers in Sports*, (In preparation).

II – Papers

1. MacLean,L., Yu, L., and Zhao, Y. (2022). A Generalized Entropy Approach to Portfolio Selection under a Hidden Markov Model. *Journal of Risk and Financial Markets*, 15(8), 337.Doi Number: 10.3390/jrfm15080337- paper has been selected for issue cover.

2. MacLean, L. and Ziemba, W. (2022). Superbowl 2022 and a tribute to Tom Brady's career. *Wilmott,* September.

3. MacLean, L. and Zhao, Y. (2021). Kelly Investing with Downside Risk Control in a Regime Switching Market. *Quantitative Finance* 22:1, 75-94.

4. MacLean, L. and Ziemba, W. (2021). Who are the most important players in team sports? *Journal of Prediction Markets, V15, no 3, p 33-83.*

5. MacLean, L. and Ziemba, W. (2021). Winning Hockey - Team and Player Impact in the NHL. *Wilmott,* 115, p. 48–57.

6. L. MacLean and Ziemba, W, (2021). "The game box score in basketball - linking statistics to game outcomes," *Wilmott*, vol. 2021, 114, p. 32–39.

7. MacLean, L. and Ziemba, W. (2021). The Covid19 NFL playoffs and Super Bowl 2020-21. *Wilmott*, May, p 34-49.

8. Brown, M.G., MacLean, L.C. , Hicks, V, Murray, T.J., (2020). Measuring marginal and cumulative health outcomes relative to self-controls in chronic disease cohorts exposed to a novel therapy. Submitted to *Medical Decision Making.*

9. MacLean, L. and Ziemba, W. (2020). NFL 2019-2020 update and review of the season and superbowl. *Wilmott,* Wiley.

10. Sun. W., Zhao, Y. and MacLean, L. (2020). Real Options in a Duopoly with Jump Diffusion Prices. *Asia Pacific Journal of Operations Research.* https://doi.org/10.1142/S0217595921500093.

11. MacLean, L. and Ziemba, W. (2020). NFL Team Composition: Are the best players on the best teams? *Wilmott,* Wiley.

12. MacLean, L. and Ziemba, W. (2019). The 2018-2019 NFL Season, Playoffs and Super Bowl. *Wilmott,* Wiley.

13. Maclean, L., MacLean, S., and Richman A. (2020). Failure Event Severity and Risk Assessment. *Safety Science, v123.* doi.org/10.1016/j.ssci.2019.104554.

14. MacLean, L. Ziemba, W. (2018). The Efficiency of NFL Betting Markets. *Wilmott.*

15. MacLean, L., Ziemba, W. and Korgan, A. (2018)."The expected utility of performance: dominant batting seasons in baseball," *Wilmott*, vol. 98, p. 40–43.

16. MacLean, L. and W. Ziemba (2018).Sports Statistics II: Analytics. *Wilmott.*

17. MacLean, L. and W. Ziemba, (2017) "Sports statistics: rating batters in baseball," *Wilmott*, vol. 92, p. 32-35.

18. MacLean, L., Ziemba, W. and Korgan, A. (2017). Measuring Performance: The Case of Batting Impact in Baseball. Working paper.

19. MacLean, L., Richman, A. and Hudak, M. (2017). Failure Rates for Aging Aircraft. *Safety* 4(7), p 1-12.

20. MacLean, L. and W. Ziemba (2016). Primer on Dynamic Portfolio Theory. *Wilmot,* 82, p 12-17.

21. MacLean, L., Richman, A. and MacLean, S. (2016). Benchmarking Airports with Specific Safety Performance Measures. *Transportation Research A.* Vol 92, 349-364.

22. MacLean, L. and W. Ziemba (2016). Primer on Static Portfolio Theory. *Wilmott* 81, p 22-27.

23. Yuan, J, MacLean, L, Xu, K and Zhao, Y (2016). Regime Dependent Sensitivity of International Markets to Common Risk Factors. *Frontiers of Business Research*. Volume 10, Number 3.

24. MacLean, L., Zhao, Y. and Ziemba, W. (2016). Optimal capital growth with convex shortfall penalties. *Quantitative Finance* 16(1), p 101-117.

25. MacLean, L. and W. Ziemba (2015). A Primer on Utility Theory. *Wilmott* 80. p 22-29.

26. MacLean, L. and W. Ziemba (2015). A Primer on Stochastic Dominance. *Wilmott* 79, pp 18-21.

27. MacLean, L., Richman, A., and MacLean, S. (2014). Operational Performance Measures for National Air Traffic Control Systems. *Proceedings of ATRS World Congress*, Bordeaux, France.

28. MacLean, L., Zhao, Y.(2014). Asset Price Dynamics: Shocks and Regimes. In *Optimal Financial Decision Making Under Uncertainty,* Consigli, Kuhn, Brandimarte, eds, Springer, New York.

29. MacLean, L. and W. Ziemba (2014). A Primer on Arbitrage and Asset Pricing. *Wilmott* 70, pp 26 -29.

30. MacLean, L. and W. Ziemba (2014). A Primer on Risk Measures. *Wilmott* 69, pp 52 -55.

31. MacLean, L., Zhao, Y., and Ziemba, W. (2013). Endogenous Volatility for Hedging Options with Transaction Costs. *Quantitative Finance 13(5), p 699-713*.

32. MacLean, L.C. and Ziemba, W.T. (2013). The Kelly Criterion with Games of Chance. *Oxford Handbook of the Economics of Gambling,* Williams and Siegal, Eds, Oxford University Press, p 402–427.

33. MacLean, L., Zhao, Y., and Ziemba, W. (2012) .Currency Returns, Market Regimes and Behavioral Biases. *Annals of Finance 9(2), p 249-269.*

34. MacLean, L. and Richman, A. (2012) Aggregate Risk Measures for Dynamic Systems from Operational Data. *International Journal of Risk, Quality and Safety Engineering* 19(4), p 1-23.

35. MacLean, L.C. and Ziemba, W.T. (2012). The Capital Growth Kelly Criterion Model. *Handbook of the Fundamentals of Financial Decision Making.* World Scientific Publishing Co, Singapore.

36. Yuan, J., MacLean, L., Xu, K. and Zhao, Y (2012). How Local Markets Respond to Global Risk Factors Differently in Various Market regimes. *Proceedings of the Midwest Finance Association Conference*, New Orleans, La.

37. MacLean, L., Thorp, E., Zhao, Y. and Ziemba, W. (2011). How does the *Fortune's Formula* – Kelly capital growth model perform? *Journal of Portfolio Management, V37(4), p 96-111.*

38. MacLean L.C. and W.T.Ziemba (2011). A general Kelly strategy for investing. *Stochastic Optimization Methods in Finance and Energy.* Bertocchi, Consigli and Dempster, eds. Springer, p 3-20.

39. Ma, Ying, MacLean, L., Xu, K. Zhao, Y. (2011) A Scenario-Dependent Market Neutral Strategy for Sector Select ETF's. *Pacific Journal of Optimization 7(2), p281-296.*

40. Lustbader, D., O'Hara, D., MacLean, L., et al. (2011). Second brain death examination may negatively affect organ donation. *Neurology 76:119-124*.

41. MacLean, L., Zhao, Y., and Ziemba, W. (2011). Mean-Variance versus Expected Utility in Dynamic Investment Analysis." *Computational Management Science* 8:1, pp3-22.

42. MacLean, L., Ziemba, W., & Zhao, Y. (2010) Growth-Security Models and Stochastic Dominance. in *Stochastic Programming: State of the Art: In Honour of G. B. Dantzig.* Gerd Infanger, Ed., Springer, NY, p 277-296.

43. MacLean, L., Thorp, E. and Ziemba, W. (2010). Long term capital growth: The good and bad properties of the Kelly and fractional Kelly capital growth criterion. *Quantitative Finance, Vol. 10, No. 7, 681-687.*

44. MacLean, L., Thorp, E., and Ziemba, W. (2010). Good and bad properties of the Kelly Criterion. *The Kelly Capital Growth Investment Criterion: Theory and Practice.* World Scientific Publishing Co., Singapore, pp 563-574.

45. MacLean, L., Thorp, E., Zhao, Y. and Ziemba, W. (2010) Medium term simulations of Kelly, fractional Kelly and proportional betting strategies. *The Kelly Capital Growth Investment Criterion: Theory and Practice.* World Scientific Publishing Co., Singapore, pp 543-562.

46. MacLean, L., Richman, A. (2009). Risk Assessment for Multiple Hazards with Sensitivity to the Concentration of Severity. *Proceedings of ISSC 27*.

47. Consigli, G., MacLean, L., Zhao, Y., and Ziemba, W. (2009). The Bond-Stock Yield Differential as a Risk Indicator in Financial Markets. *The Journal of Risk 11(3),1-22*.

48. MacLean, L., Consigli, G., Zhao, Y. and Ziemba, W. (2008) Risk Indicators in Financial Markets. *Mathematical Methods in Economics and Finance* Vol 3, No 2., pp 101-118.

49. MacLean, L., Richman, A.(2008). An aggregate risk priority index for systems failures. *Proceedings of 26th International Systems Safety Conference*, Vancouver, Canada.

50. MacLean, L., Ziemba, W.T. (2008) The Kelly Strategy. *Encyclopedia of Quantitative Finance.* John Wiley and Sons, UK.

51. MacLean, L., Zhao, Y., Consigli, G., and Ziemba, W.(2007). Estimating parameters in a pricing model with state dependent shocks. *Handbook of Financial Engineering*, C. Zopounidis, Ed., Springer. P 231 – 245.

52. Richman, A. and Maclean, L. (2007). Airport Risk Management Intelligence Systems. *Proceedings of 25th International Systems Safety Conference*, Baltimore, MD.

53. MacLean, L., Richman, A. and Larsson, S. (2007). Statistical Methods for Poisson Distributors. *Proceedings of 25th International Systems Safety Conference*, Baltimore, MD.

54. MacLean, L., Richman, A. (2007). Early Evidence of Degradation in a Cohort of Aircraft. *Proceedings of Aging Aircraft Conference*, Palm Springs, CA.

55. MacLean, L., Foster, M., & Ziemba, W.T. (2007). Covariance complexity and rates of return on assets. *Journal of Banking and Finance, 31:11.* p. 3503 – 3523.

56. MacLean, L., Richman, A.(2006). An Aggregate Safety Index for Air Traffic Management Systems. *Proceedings of the 24th International Systems Safety Conference*, Albuquerque, NM.

57. MacLean, L., Richman, A., and Larsson, S.(2006). Patterns of Use and Safety with Commercial Aircraft. *Proceedings of the 24th International Systems Safety Conference*, Albuquerque, NM.

58. Richman, A., Richman, V., MacLean, L. (2006) A New Performance Measure for Commercial Airlines: Daily Flying Hours Ratio. *Perspectives on Performance*, 5:1.p 13-15.

59. MacLean,L., Zhao.Y., & Ziemba, W.T. (2006). Dynamic portfolio selection with process control. *Journal of Banking and Finance, 30:2,* pp 317 – 339.

60. MacLean, L., Ziemba, W. (2006) Capital Growth: Theory and Practice. *Handbook of Asset and Liability Management*, S. Zenios and W. Ziemba, eds. Elsevier Science, Amsterdam.

61. MacLean, L. and Richman, A.(2005) Systems reliability and maintenance. *Proceedings of the 23nd International Systems safety Conference.* San Diego, Ca.

62. MacLean, L. & Ziemba, W.T. (2005). Time to wealth goals in capital accumulation. *Quantitative Finance,* v5:no4, pp. 343-357.

63. MacLean,L., Richman,V., Richman,A., & Larsson, S. (2005). The Dynamics of Aircraft Degradation and Mechanical Failure. *Journal of Transportation and Statistics,* Vol 8, No 1, pp1-11.

64. Foster, M., & L MacLean (2004). Historic Simulation of an Optimal Portfolio Model. *Canadian Journal of Business Economics,* Sept. 2004, pp 1-9.

65. MacLean, L., & A. Richman (2004) A Summary Index of Risk with Application to Aviation Safety. *Proceedings of the 22nd International Systems safety Conference*, Providence, RI.

66. MacLean, L., Consigli, G. and Ziemba, W. (2004) Modeling Market Returns with a Speculative Bubble. *2004 Proceedings of the American Statistical Association*, Alexandra, VA: American Statistical Association.

67. MacLean, L., Richman, V., Richman, A. (2004). The Predictability of Aircraft Failures with Age. *Journal of Aerospace 2003*, pp 413-420.

68. MacLean, L., Larsson, S., Richman. A. (2003). An Efficiency Analysis of Aircraft Maintenance Programs. *SAE Transactions*. Manuscript 2003-01-2978.

69. MacLean, L., Richman, A. (2003). An Epidemiological Approach to Aviation Safety. *Proceedings of* 21st *International Systems Safety Conference*, Ottawa.

70. MacLean, L., Zhao, Y., & Ziemba, W.T. (2003). A process control approach to investment risk. *IEEE International Conference on Computational Intelligence for Financial Engineering, p.* 265-270.

71. MacLean,L., Ziemba,W.T., & Zhao, Y.(2003). Capital growth with security. *Journal of Economic Dynamics and Control,* vol. 28, no.5, p937-954.

72. MacLean, L., Foster, M., & Ziemba, W.T. (2003). Empirical Bayes estimation of securities price parameters. *Financial Engineering, E-Commerce and Supply Chain.* P.M. Paradalos and V.K.Tsitsiringos, eds. Boston: Kluwer Academic, 47-58.

73. MacLean,L., Richman, A., & Weldon, K. (2002). Systems degeneration and repair: modeling health status. Working Paper, School of Business Administration, Dalhousie University.

74. MacLean, L., Richman, V., Richman, A., & Larsson, S. (2002). A model for aircraft aging. *2002 Proceedings of the American Statistical Association*, Alexandria, VA: American Statistical Association.

75. MacLean, L., Zhao, Y., & Ziemba, W.T. (2002). Wealth goals investing. *Applications of Stochastic Programming, S.*Wallace and W.T. Ziemba, eds, MPS-SIAM Series in Optimization. p.509 - 521.

76. MacLean, L., & Foster, M. (2001). Empirical Bayes estimation of securities price distributions. *2001 Proceedings of the American Statistical Association*, Alexandria, VA: American Statistical Association.

77. MacLean,L. & Richman, A. (2001). Resource absorption in health maintenance systems. *Health Care Management Science*, vol. 4, no.4, pp. 337-347.

78. MacLean, L., Richman, A., & Larsson, S. (2000). Aircraft maintenance: An efficiency analysis. *Proceedings of Atlantic Schools of Business Conference*, St. Johns, Nfld.

79. MacLean, L.C., & Ziemba, W.T. (2000). Efficiency concepts in capital accumulation models. *Philosophical Transactions of the Royal Society A*, vol. 357, p. 2029-2037.

80. MacLean, L.C., & Richman, A. (1999). Cost versus reliability in aircraft maintenance. *Proceedings of the Sciences and Engineering Section*, American Statistical Association Joint Meetings, Baltimore.

81. MacLean, L.C., & Ziemba, W.T (1999). Growth versus security in dynamic investment analysis. *Annals of Operations Research.* vol. 85, pp.193-225.

82. MacLean, L.C., & Richman, A. (1998). The efficiency of aircraft maintenance programs. *Handbook of Airline Finance*. New York: McGraw-Hill, p. 585-592.

83. MacLean, L.C., & Weldon, K.L. (1996). Estimation of multivariate random effects without replication. *Communications in Statistics,* vol. 25, no. 7, pp. 1447-1469.

84. MacLean, L.C., Ziemba, W.T., & Blazenko, G. (1992). Growth versus security in dynamic investment analysis. *Management Science,* vol. 38, no. 11.

85. MacLean, L.C., & Ziemba, W.T. (1991). Growth-security profiles in capital accumulation under uncertainty. *Annals of Operations Research* vol. 81.

86. MacLean, L.C., & Richman, A. (1990). Service profile variations. *Proceedings of the American Statistical Association*.

87. MacLean, L.C., & Ziemba, W.T. (1989). Balancing growth and security. *Computing and Computers for Control Systems*, P. Borne, et al., ed. Basel, Switzerland: J.C. Baltzer, AG Scientific Publishing Co., pp. 417-419.

88. MacLean, L. , & Richman, A.(1989). Physician practice style variations. *Socio-Economic Planning Sciences*, vol. 23, no. 6, 361-371.

89. MacLean, L.C., & Weldon, K.L. (1988). Bayes estimation of factor scores. *Proceedings of the American Statistical Association.*

90. MacLean, L., Richman, A., & Garner, B. (1987). Adaptive decisions in the use of hospital beds. *Health Services Research* vol. 21, no.6.

91. Sutherland, W.R.S., & MacLean, L.C. (1987). Sensitivity analysis of optimal growth plans. *Journal of Economics*, vol. 21, no. 6, pp.741-755.

92. MacLean, L.C., & Ziemba, W.T. (1986). Growth versus security in a risky investment model. in *Stochastic Programming*, (ed. F. Archetti, G. DiPillo, and M. Lucertini), *Lecture Notes in Control and Information Sciences*, 76, New York: Springer-Verlag, pp. 78-88.

93. MacLean, L.C., & Ziemba, W.T. (1985). Expected values versus probability of ruin strategies. in *Stochastic Optimization*, ed. V. Arkiin, A. Shiracv, and R. Wets, *Lecture Notes in Control and Information Sciences*, 81, New York: Springer-Verlag, pp. 448-457.

94. MacLean, L.C., & Sutherland, W.R.S. (1985). A nonlinear planning model with borrowing. *Utilitas Mathematica*, vol. 28, pp.19-29.

95. MacKay, R.C., Storey, R.G., & MacLean, L.C. (1985). Job design for staff nurses: Different jobs for different nurses. *Nursing Management*, pp. 76-80.

96. Coffey, W.J., MacLean, L.C., & Goodchild, M. (1982). Randomness and order in the topology of settlement systems. *Journal of Economic Geography*, vol. 58, pp. 20-29.

97. MacLean, L.C., Field, C.A., & Sutherland, W.R.S. (1981). Optimal growth and uncertainty: The borrowing models. *Journal of Economic Theory*, vol. 24, no. 2, pp.168-187.

98. MacLean, L.C. (1980). Lagrange multipliers for chance constrained programs. *Methods of Operations Research*, 41.

99. Brown, M.G., & MacLean, L.C. (1980). Computerized ECG Interpretation: Technological Change for the Masses. In *Optimization of computer – ECG Processing*, ed. H. Wolf and P. MacFarlane, Amsterdam: North Holland.

100. MacLean, L.C., & Weldon, K.L. (1977). Self sufficiency in a regional hospital system. *Health Services Research*, Fall, pp. 511-522.

101. Gordon, P.O., Weldon, K.L., & MacLean, L.C. (1975) Trends in the frequency of selected surgical procedures. *N.S. Medical bulletin*, vol. 54, pp. 191-195.

102. MacLean, L.C., Weldon, K.L. , & Gordon, P.C. (1974). Trends in hospital beds in Nova Scotia: Current supply and future needs. *N.S. Medical Bulletin*, 53, pp. 3-12.

103. Gordon, P.C., Weldon, K.L., & MacLean, L.C. (1974). Trends in hospital utilization in Nova Scotia. *N.S. Medical Bulletin*, 53.

104. Foster, M.E., & MacLean, L. C. (1985) *An Evaluation of the Strait of Canso Subsidiary Agreement.* Report to Department of Regional Industrial Expansion.

105. MacLean, L.C. (1984). *The Health Service System in Nova Scotia: A Physician Perspective*, Report to Nova Scotia Medical Society for the Federal Task Force on Resource Association.

106. Storey, R.G., MacLean, L.C., et al. (1981). *Turnover of Staff Nurses in Nova Scotia: Causes and Remedies*, Queens Printer, Nova Scotia, 201 pp.

107. MacLean, L.C., & Duffy, J.F. (1981, March). *An Experiment in Coeducational Venturing*, a report to the Girls in Scouting task group.

108. MacLean, L.C., & Weldon, K.L. (1978, July). *Household Distribution in the Rural Areas of the Atlantic Provinces*, Government Studies Program, Dalhousie University. (Technical report to the Department of Communications, Government of Canada).

109. Weldon, K.L., & MacLean, L.C. (1977, July). *Atlantic Region Demographic Study*, Government Studies Program, Dalhousie University. (Technical report to the Department of communications, Government of Canada).

110. MacLean, L.C., & Pereira, L. (1974). *A Compendium of Health Indices*, Department of Preventive Medicine, Dalhousie University. (This 18 volume series contains profiles of the counties of Nova Scotia).

Conference Presentations (in abstract)

I have made numerous presentations at national and international seminars, workshops and conferences. Presentations since 2000:

1. "Kelly Investing and Risk Control". Stochastic Programming XV, Trondhiem, Norway, July 2019.

2. "Optimal Growth Investing and Wealth Benchmarking". 60th Annual CORS Conference, Halifax, June, 2018

3. "Log Optimal Growth and the Kelly Strategy". UNICOM Workshop, London, June 17, 2017.

5. "Endogenous Benchmarks in Stochastic Dynamic Investment". Stochastic Programming XIV, Buzios, Brazil, July, 2016.

6. "Optimal Capital Growth with Convex Shortfall Penalties". 4th International Conference on Intelligent Finance, December 2015, Chongqing, China.

7. "Capital Growth with Controls on the Rate and Size of Shortfalls". International Symposium on Mathematical Programming, Pittsburgh, Pa, July, 2015.

8. "Operational Performance Measures for National Air Traffic Control Systems." Air Transport Research Society World Congress, Bordeaux, France, July, 2014.

9. "Optimal Growth with Convex Loss Penalties" Stochastic Programming XIII, Bergmo, Italy, July, 2013

10. "Capital Growth with Shortfall Penalties" Workshop on Stochastic Optimization, Bonn, Germany, May, 2013.

11. "How Local Markets Respond to Global Risk Factors Differently in Various Market regimes." Midwest Finance Association Conference, New Orleans, La, February, 2012.

12. "How does the *Fortune's Formula*- Kelly capital growth model perform". European Financial Management Association Conference, Braga, Portugal, June, 2011.

13. "Optimal Capital Growth with Convex Loss Penalties". International Federation of Operations Research Societies Conference, Melbourne, Australia, July 2011.

14. "A Portfolio Optimization Model with Regime-Switching Risk Factors" INFORMS Conference, Charlotte, NC, November, 2011.

15. "Aggregate Risk Measures and Risk Aversion" Society for Risk Analysis, Salt Lake City, Dec, 2010.

16. "Optimal Diversification of Currency Portfolios with Markov Regime Switching" SPXII, Halifax, Aug., 2010.

17. "A Market Neutral Strategy for Exchange Traded Funds" MAF'10 Ravello, Italy, April 2010.

18. "Regime Dependent Capital Growth with Security Using Convex Penalties" INFORMS, San Diego, Oct. 2009.

19. "Risk Assessment for Multiple Hazards with Sensitivity to the Concentration of Severity" SS XXIII Conference, Huntsville, Alabama, Aug. 2009.

20. "Regime Dependent Capital Growth with Security Using Convex Penalties" CORS Toronto, June, 2009.

21. "Currency Regimes and Weak Interest Rate Parity" INFINITI Conference, Dublin, July, 2009.

22. "An Aggregate Risk Index for Systems Failures" SS XXII Conference, Vancouver, Aug., 2008.

23. "Risk Indicators in Financial markets", MAF'08, Venice, March 26-28, 2008.

24. "The Control of Investment Risk" SPXI Conference, Vienna, August 27 – 31, 2007.

25. "Statistical Methods for Poisson Distributors", Systems Safety XXI Conference, Baltimore, August 15, 2007.

26. "Weak Interest Rate Parity and Currency Portfolio Diversification" EURO 2007, Prague, July, 2007

27. "The Kelly Criterion", Keynote address (with W. Ziemba) at EURO 2006, Reykjavik, Iceland, July, 2006.

28. "Risk Control in a Speculative Financial Market", presented at EURO 2006, Reykjavik, Iceland, July, 2006.

29. "Weak Interest Rate Parity and Currency Portfolio Diversification", presented at the China International Finance Conference 2006, Xi'an, China, July, 2006.

30. "Speculative Bubbles: Asset Prices with Yield Dependent Market Corrections", presented at the International Conference in Financial Engineering, Gainsville, Florida, March, 2006.

31. "Pricing Models with State Dependent Shocks", presented at International Federation of Operations Research Societies Conference, Hawaii, August, 2005.

32. "Systems Reliability and Maintenance", presented at the 23^{rd} International Systems Safety Conference, San Diego, August, 2005.

33. "Capital Growth: Theory and Practice", presented at Canadian Operations Research Society Conference, June, 2005.

34. "Market Bubbles and Dynamic Control Strategies", presented at *X Stochastic Programming Conference*, Tucson, Arizona, October, 2004.

35. "Modeling Market Returns with a Speculative Bubble", presented at the *Joint Statistical Meetings*, Toronto, Canada, August, 2004.

36. "Risk Indexing with Commercial Aircraft", presented at *22nd International Systems Safety Conference*, Providence, NH, August, 2004.

37. "Risk Control in a Speculative Financial Market", presented at *Bachelier Finance Society Third World Congress,* Chicago, July, 2004.

38. "Market Bubbles and Dynamic Control Strategies", presented at *APMOD2004*, Brunel University, London, UK, June, 2004.

39. "Risk Control of Dynamic Investment Models," presented at *INFORMS*, Atlanta, October, 2003.

40. "Epidemiological Approach to Aviation Safety," presented at the *21st International Systems Safety Society Conference*, Ottawa, August, 2003.

41. "Empirical Bayes Estimation with Portfolio Models," presented at the *Statistical Society of Canada Annual Conference*, Halifax, June, 2003.

42. "Alternative Approaches to Investment Risk," presented at the *International Conference* on *Modeling, Optimization and Risk Management in Finance*, University of Florida, March, 2003.

43. "Time to Wealth Goals in Capital Accumulation," presented at the *Bachelier Finance Society World Congress*, Crete, June, 2002.

44. "Wealth Goals Investing," presented at *APMOD 2002*, Varena, Italy, June, 2002.

45. "Aging Aircraft: Evidence from Unscheduled Landings," presented at the *American Statistical Association JSM*, New York, August, 2002.

46. "Capital Growth with Security," presented at the *IX Stochastic Programming Conference*, Berlin, August, 2001.

47. "Empirical Bayes Estimation of Asset Price Distributions," presented at the *American Statistical Association JSM*, Atlanta, August, 2001.

48. "System Degeneration and Repair: Modeling Health Status," presented at the
49. *Health Services Research Conference*, Los Angeles, July, 2001.

50. "Aircraft Maintenance: An Efficiency Analysis," presented at the *Atlantic Schools of Business Conference*, St. Johns, October, 2000.

51. "Growth Versus Security in Capital Accumulation," presented at the *Workshop on Risk*, Carnegie Mellon University, Pittsburg, July 2000.

52. "Capital Growth with Security," presented at *APMOD 2000*, Brunel University, London, April, 2000.

Research Grants
I have held external funding for my research program during my career at Dalhousie (1972 – present). My grants have been to support travel, and expenses such as computing, printing and telephone.

Type of Grant	Funding Agency	Amount	Term
Research Grant	Lamb Trust	$70,000	2006-2014
Discovery Grant	NSERC	$55,000	2005-2010
Individual Operating Grant	NSERC	$50,000	2000-2005
Research Grant	School of Business	$3,500	2000
Individual Operating Grant	NSERC	$40,000	1996 – 2000
Individual Operating Grant	NSERC	$18,000	1989 – 1992
Individual Operating Grant	NSERC	$15,000	1986 - 1989
Individual Operating Grant	NSERC	$12,000	1983 – 1986
Travel Grant	NSERC	$720	1983
Research Grant	RDF	$1,100	1981
Individual Operating Grant	NSERC	$10,000	1980 – 1983
Individual Operating Grant	NSERC	$7,500	1977 - 1980
Research Grant	Nova Scotia Council of Health	$3,300	1975
Research Grant	Dennis Medical Fund	$1,200	1974
Research Fellowship	National Health and Welfare	$28,800	1972 - 1975

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Administration and Service

Committees
I have served on many university committees and administrative units. In the most recent year (2003) I serve on the following:

University Senate
Senate Committee on Academic Administration
Faculty of Graduate Studies: RDF Committee
Faculty of Graduate Studies: International Development Studies Unit Review Committee
Faculty of Medicine: CH&E Promotion and Tenure Committee
Faculty of Management: SBA Research Committee.
Faculty of Management: MBA Curriculum Committee.

Associations
I am a member of the following associations:
American Statistical Association (ASA)
Stochastic Optimization Network (SONET)
EURO Working Group on Financial Modeling.
INFORMS

Editing &Reviewing
Editor, *Quantitative Finance Letters*
Reviewer for the following journals:
Operations Research Spectrum
SIAM journal on Applied Mathematics
Annals of Operations Research
Applied Mathematical Finance
Banking and Finance
Canadian Journal of Administrative Sciences
Computational Optimization and Applications
Health Services Research
International Journal of Operations Management
Journal of Economic Theory
Management Science
Quantitative Finance
Socio-Economic Planning Sciences