

August 13, 2007

ALLANUS H. TSOI CURRICULUM VITAE

Personal Data

Name	Allanus Hak-Man Tsoi
Place of Birth	Hong Kong, China
Nationality	British (BNO holder)
Marital Status	Married in 1986
Office Address	Department of Mathematics, 202 Mathematical Sciences Bldg, University of Missouri, Columbia, MO 65211, USA
Tel. No. (office)	(573) 882-8384
Email Address	tsoi@math.missouri.edu
Specialization	Stochastic analysis, classical and quantum white noise theory, point processes, mathematical information theory, stochastic filtering and control, mathematical finance.

Education

1990 Ph D; University of Alberta, Edmonton, Alberta, Canada
(Supervisor : Robert J. Elliott)

1980 M Sc; University of Illinois, Urbana, Illinois, USA

1977 B Sc (with distinction in mathematics); University of
Washington, Seattle, Washington, USA

Awards

1975 Certificate of High Scholarship; University of Washington

1976 Certificate of High scholarship; University of Washington

1977 Summa cum laude; University of Washington

Appointment

Sept. 2006 -	Professor; Department of Mathematics, University of Missouri, Columbia, Missouri. U.S.A. .
Sept. 2003 - Aug. 2006	Associate Professor; Department of Mathematics, University of Missouri, Columbia, Missouri. U.S.A. .
2001 - Aug. 2003	Assistant Professor; Department of Mathematics, University of Missouri, Columbia, Missouri. U.S.A. .
1991 - 2000	Assistant Professor; Department of Mathematics, Hong Kong University of Science and Technology. Hong Kong.
1990	Research Associate; Department of Statistics and Applied Probability, University of Alberta, Edmonton, Alberta, Canada.
1986	Lecturer; Department of Mathematics, Hong Kong Baptist College. Hong Kong.
1983 - 1986	Assistant Lecturer; Department of Mathematics, Hong Kong Baptist College. Hong Kong.
1982 - 1983	Assistant Lecturer; Department of Mathematics, Hong Kong Lingnan College. Hong Kong.

Publication

1. On Reinsurance and Investment for Large Insurance Portfolios (with S. Luo and M. Taksar). To appear in Insurance: Mathematics and Economics (2007).
2. The Lévy Laplacian Acting on Some Class of Lévy Functionals (with K. Saitô). To appear in Quantum Probability and White Noise Analysis, World Scientific, 2007.
3. Filtering of Hidden Weak Markov Chain - Discrete Range Observations (with S. Luo). Hidden Markov Models in Finance. International Series in Operations Research and Management Science, Vol. 104; R. Elliott and R. Mamon ed., Springer, 2007, p. 101-119.

4. Jump Finding of a Stable Process (with Si Si and Win Win Htay). Quantum Information V, 2006, T. Hida and K. Saitô ed., p.193-202.
5. Fractional Brownian Motion and the Lévy Laplacian (with K. Nishi and K. Saitô). Quantum Information V, 2006, T. Hida and K. Saitô ed., p.181-192.
6. Invariance of Poisson Noise (with Si Si and Win Win Htay). Stochastic Analysis: Classical and Quantum - Perspectives of White Noise Theory, World Scientific, 2005, p. 199 - 210.
7. Hidden Markov Filter Estimation of the Occurrence Time of an Event in a Financial Market (with Robert Elliott). Journal of Stochastic Analysis and Application, Vol.23, No. 6, 2005, p. 1165 - 1178.
8. Hidden Markov Volatility Estimation (with R.J. Elliott and P. Malcolm). Proceedings of 41st IEEE Conference on Decision and Control, Vol. 1, 2002, Las Vegas, p. 398- 404.
9. Robust Parameter Estimation for Asset Price Models with Markov Modulated Volatilities (with R.J. Elliott and P. Malcolm). Journal Economic Dynamics and Control, 27, 2003, p. 1391- 1409.
10. L-Transform, Normal Functionals, and Lévy Laplacian in Poisson Noise Analysis. Proceedings of Workshop on Stochastic Theory and Control, Lawrence, Kansas. Springer, 2002, p. 471- 489.
11. Poisson Noise Analysis based on the Lévy Laplacian (with A. Ishikawa and K. Saitô). Quantum Information IV. Eds. T. Hida and K. Saitô. World Scientific Publishing, 2002, p. 103- 114.
12. A Stochastic Expression of a Semi-Group generated by the Lévy Laplacian (with K. Nishi and K. Saitô). Quantum Information III. Eds. T. Hida and K. Saitô. World Scientific Publishing, 2001, p. 105- 117.
13. Stochastic Processes Generated by Functions of the Lévy Laplacian (with K. Saitô). Quantum Information II. Eds. T. Hida and K. Saitô. World Scientific Publishing, River Edge, NJ, 2000, p. 183-194.
14. Stopping Curves and Martingales. Trends in Contemporary Infinite Dimensional Analysis and Quantum Probability. Eds. L. Accardi et al. ISEAS, Kyoto, 2000, p. 425- 432.
15. Retarded Jump Diffusion Equations and Stability (with B. Zhang). Journal Communications in Applied Analysis, Vol. 4, No. 4, 2000, p.495- 510.

16. European Option Pricing when the Riskfree Interest Rate follows a Jump Process (with H. Yang and S.N. Yeung). *Comm. Statist. Stochastic Models* 16, No.1, 2000, p. 143- 166.
17. Short Rate Analysis and Marked Point Processes (with R.J. Elliott and S.H. Lui). *Mathematical Methods of Operations Research*. Vol. 50, No. 1, Springer-Verlag, 1999, p. 149 - 160.
18. The Lévy Laplacian as a Self-Adjoint Operator (with K. Saitô). *Quantum Information I*. Eds. T. Hida and K. Saitô. World Scientific Publishing, River Edge, NJ, 1999, p. 159- 171.
19. The Lévy Laplacian Acting on Poisson Noise Functionals (with K. Saitô). *Infinite Dimensional Analysis, Quantum Probability and Related Topics*, Vol.2, No. 4, 1999, p. 503- 510.
20. Some Generalizations of Semimartingales in the Plane. *Chinese Journal of Applied Probability and Statistics*, Vol. 15, No.3, 1999, p. 310- 318.
21. Practical Stability in p-th Mean and Controlability of Lévy Flow (with D. Kannan and B. Zhang). *Journal Communications in Applied Analysis*, Vol. 2, No. 1, 1998, p. 65 - 80.
22. Existence of Densities for Functionals of The Single Jump Process. *Stochastic Analysis and Applications*, 15 (3), 1997, p. 431- 442.
23. Practical Stability of Itô Type Nonlinear Stochastic Differential Systems and Related Control Problems (with B. Zhang). *Dynamic Systems and Applications*, Vol. 6, No. 1, 1997, p. 107 - 124.
24. Weak Exponential Stability of Stochastic Differential Equations (with B. Zhang). *Stochastic Analysis and Applications*, 15 (4), 1997, p. 643 - 649.
25. A Characterization of k-Parameter Quasimartingales. *Statistics and Probability Letters*, 28, 1996, p. 337 - 343.
26. Lyapunov Functions in Weak Exponential Stability and Controlled Stochastic Systems (with B. Zhang). *Journal of Ramanujan Math. Society*, Vol. 11, No.2, 1996, p. 85 - 102.
27. Weak Exponential Stabilization of Some Itô Stochastic Systems (with Rong and B. Zhang). *Proceedings of Symposium on Control, Optimization and Supervision CESA'96 IMACS Multiconference*. Lille, France, July, 1996, p. 115 -117.

28. Asymptotic Study of Estimation in Filtering for Linear Systems with Jump Parameters (with F. Dufour and R.J. Elliott). Proceedings of 34th IEEE Control and Decision Conference, New Orleans, Dec. 1995, p. 3349 - 3353.
29. Integration by Parts for Two- Parameter Single Jump Processes. Stochastic Analysis and Applications, Vol. 12, No. 4, 1994, p. 499 - 504.
30. Martingale Representation in Continuous Trading (with R.J. Elliott). Proceedings of 33rd IEEE Control and Decision Conference, Florida, Dec. 1994, p. 2807 - 2812.
31. Integration by Parts for a Lie Group Valued Brownian Motion. Journal of Theoretical Probability, Vol. 6, No. 4, 1993, p. 693 - 698.
32. Time Reversal of Infinite- Dimensional Point Processes. Journal of Theoretical Probability, Vol. 6, No. 3, 1993, p. 451 -461.
33. Integration by Parts for Poisson Processes (with R.J. Elliott). Journal of Multivariate Analysis, Vol. 44, No. 2, 1993, p. 179 - 190.
34. Integration by Parts for the Single Jump Process (with R.J. Elliott). Statistics and Probability Letters, Vol. 12, No. 5, 1991, p. 363 - 370.
35. Time Reversal of Non-Markov Point Processes (with R.J. Elliott). Annales de l'Institut Henri Poincare, Vol. 26, No. 2, 1990, p. 357 - 373.
36. The Predictable, Accessible And Totally Inaccessible Properties of the Single Jump Process (with D.B. Colwell). Applied Mathematics Notes, Vol. 13, 1988, p. 1 - 8.
37. Filtering of Hidden Weak Markov Chain - Continuous Range Observations (with S. Luo). Under revision.
38. Discrete Time Weak Markov Control - Dynamic Programming Equation with Finite Horizon. Under revision.
39. On Vega Hedging of Asian Options Through the Gross Laplacian (with K. Saitô). Under revision.
40. Weak Markov Modulated Drift and Volatility Estimation (with S. Luo and P. Yin). Submitted.
41. Optimal Stopping with Partial Weak Markov Observation (with S. Luo). Preprint.
42. Drift and Volatility Factorization (with H. Guo). Preprint.

- 43. On Some Generalized Poisson Noise and Associated Characteristic Functionals. Preprint.
- 44. Jump Finding Techniques in Short Rate Analysis (with Si Si). Preprint.
- 45. Discrete Time Weak Markov Control - The Discounted-Cost Optimality Equation with Infinite Horizon. Working paper.
- 46. American Option Pricing under a Weak Markov Environment (with S. Luo). Working paper.
- 47. A Discrete Time Weak Markov Term Structure Model. Working paper.
- 48. On Weak Markov Renewal Theory and Applications to Queueing Theory (with S. Luo). Working paper.

Conference Presentation

- Sept. 2006 International Workshop on Stochastic Analysis. Meijo University, Nagoya, Japan.
- May 2006 International Conference on Management Science. University of Texas at Dallas.
- Jan. 2006 International Workshop on White Noise Theory. Meijo University, Nagoya, Japan.
- July 2005 International Conference on Stochastic Calculus and Its Applications to Quantitative Finance and Electrical Engineering. Calgary, Canada.
- Jan. 2005 International Workshop on White Noise Theory and Applications. Nagoya, Japan.
- Feb. 2004 International Workshop on Stochastic Processes and Information Theory. Nagoya, Japan.
- Jan. 2003 2003 Meijo Winter School on Quantum Information and Complexities. Nagoya, Japan.
- July 2002 International Conference on Filtering Theory and Applications, Edmonton and Jasper, Alberta, Canada.
- Oct. 2001 Workshop on Stochastic Theory and Control. Lawrence, Kansas, USA.

- May 2000 International Conference in Mathematical Finance. Columbia, Missouri, USA.
- June 1999 International Workshop on Mathematical Finance. Chinese University of Hong Kong, Hong Kong.
- June 1999 Bernoulli Society meeting. Beijing, China.
- Mar. 1999 Second International Conference on Quantum Information. Meijo University, Nagoya, Japan
- Mar. 1998 First International Conference on Quantum Information. Meijo University, Nagoya, Japan
- Sept. 1997 Quantitative Methods in Finance 1997 Conference, Canberra, Australia.
- June 1997 Conference on Financial Mathematics, Hong Kong University of Science and Technology, Hong Kong.
- Mar. 1997 Workshop on Mathematical Approach to Fluctuation. International Institute for Advanced Studies, Kyoto, Japan.
- July 1996 World Congress for Nonlinear Analysis. Athens, Greece.
- June 1996 Workshop on White Noise Analysis. Meijo University, Nagoya, Japan.
- May 1995 Workshop on Mathematical Approach to Fluctuation and Complexities. International Institute for Advanced Studies, Kyoto, Japan.
- Jan. 1995 Workshop on Stochastic Analysis. International Institute for Advanced Studies, Kyoto, Japan.

Research Funding

1. Stochastic calculus with respect to the Lévy fractional Brownian motion. Principle investigator, University of Missouri- Columbia Summer Research Fellowship with amount US\$8500 for summer 2002.
2. On investment risk related problems (1998) Co-investigator, RGC Competitive Earmarked Grant with amount HK\$450,000 for two years.

3. On financial time series and pricing problems (1997) Co-investigator, RGC Competitive Earmarked Grant with amount HK\$810,000 for three years.
4. On stability and control of stochastic systems (1997). Principle investigator, RGC Direct Allocation Grant with amount HK\$80,000 for one year.
5. On stochastic systems with jumps (1995) Principle investigator, RGC Competitive Earmarked Grant with amount HK\$351,000 for three years.
6. On white noise analysis (1993) Principle investigator, RGC Direct Allocation Grant with amount HK\$50,000 for one year.
7. On single jump processes (1991) Principle investigator, RGC Direct Allocation Grant with amount HK\$30,000 for one year.

Short Term Appointment

June 25-27, 2007 : Visiting Scholar. Department of Mathematical Sciences and Statistics, University of Alberta. Edmonton. Canada.

Sept. 2006 : Visiting professor. Department of Mathematics, Meijo University. Nagoya, Japan.

July 2006 : Visiting professor. Faculty of Management, University of Calgary. Calgary, Alberta, Canada.

Dec. 2005 : Visiting scholar. Department of Statistics and Actuarial Sciences, University of Hong Kong, Hong Kong, China.

August 2002 : Visiting scholar. Faculty of Management, University of Calgary, Calgary, Alberta, Canada.

May 2002 : Visiting scholar. Department of Statistics and Actuarial Sciences, University of Hong Kong, Hong Kong, China.

July 1998 : Visiting Professor. Department of Mathematical Sciences, University of Alberta, Edmonton, Canada.

May -June 1997 : Visiting Scholar. Department of Applied Mathematics, The University of Adelaide, Australia.

July 1996 : Guest Speaker. Fakultät für Wirtschaftswissenschaften und Statistik, Universität Konstanz, Germany.

July 1996 : Visiting Scholar. Laboratoire des Signaux et Systemes, University Paris XI, France.

July 1996 : Visiting Scholar. Volterra Center, University of Roma Tor Vergata, Roma, Italy.

July 1995 : Visiting Professor. Department of Mathematical Sciences, University of Alberta, Edmonton, Canada.

Sept. -Oct. 1994 : Visiting Professor. Department of Statistics and Applied Probability. University of Alberta, Edmonton, Canada.

Professional Activities

July 2007 - August 2007. Referee. Journal of Automatica.

November 2006 - Dec. 2006. Referee. Journal of Quantitative Finance.

October 2006 - Dec. 2006. Referee, Proceedings of the American Mathematical Society.

October 2006 - November 2006. Referee, Journal of Multivariate Analysis.

March-April 2006. Referee, Journal of Quantitative Finance.

Jan. 2005 - May, 2005. Referee, Journal of Stochastics and Stochastic Reports.

June 2004 - June 2005. Organizer, International Conference on Stochastic Calculus and Its Applications to Quantitative Finance and Electrical Engineering, July 24 - 27, 2005; Calgary, Alberta, Canada.

October 2004 - March 2005. Quantitative Finance Review Committee, International Conference on Stochastic Calculus and Its Applications to Quantitative Finance and Electrical Engineering, July 24 - 27, 2005; Calgary, Alberta, Canada.

August 2004 - October 2004. Referee, SIAM Journal of Control and Optimization.

November 2003 - September 2004. Referee, Journal of Stochastics and Stochastic Reports.

March 2003 - Sept. 2005. Referee, Journal of Infinite Dimensional Analysis, Quantum Probability and Related Topics.

June 2003. Chair and Organizer, Session on Quantum Information and Quantum Computing, 2003 International Multiconference on Computer Science and Computer Engineering, Las Vegas, USA.

June 2003. Associate Editor, Proceedings of International Multiconference on Computer Science and Computer Engineering in VLSI, Las Vegas, USA.

May - June 2003. Referee, Journal of Mathematical Analysis and Applications.

Jan. - March 2003. Referee, IEEE Transactions on Automatic Control, Special Issue on Control Theory and Mathematical Finance.

November 2002. Organizer, Kansas-Missouri Joint Seminar on Stochastic Theory and Applications, Columbia, MO.

April - May 2002. Referee, Journal of Infinite Dimensional Analysis, Quantum Probability and Related Topics.

Nov. 2001. Referee, American Control Conference ACC 2002.

Sept. - Dec. 1999. External Examiner, Department of Statistics and Actuarial Sciences, The University of Hong Kong.

Jan. - Feb. 1998. Referee, IFAC (International Federation of Automatic Control) Journal Automatica.

1996 - 2000. Referee, IEEE Transactions on Automatic Control.

Jan. 1996 - Sept.2000. Member, Sixth Form Mathematics and Statistics Subject Committee, Hong Kong Examination Authority.

1995 - 1996. Referee, SIAM Journal of Control and Optimization.

1995. Referee, Journal of Integral Equations and Applications.

May 1995. Invited to the first round table meeting between the International Institute for Advanced Studies (IIAS) of Japan and Santa Fe Institute, USA on May 27, 1995. The meeting took place at IIAS, Kyoto, Japan. The theme of the meeting is "Complexity, Fluctuation and Ordering".

Nov. 1994. Referee, American Control Conference ACC'95.

Mar.1993 - Mar.1994. Associate Editor, Hong Kong Statistical Society.

Mar.1992 - Mar.1993. Chairman, Editorial Board, Hong Kong Statistical Society.

Mar.1991 - Mar.1992. Member, Editorial Board, Hong Kong Statistical Society.

Mar. 1992. Chairman, Logistics Committee, International Symposium on Multivariate Analysis and Its Applications.

Other Professional Services

December 2006 - February 2007: Assessment of Research Doctorate Programs, National Research Council, U.S.A. .

June 2006 - December 2006: Consultant, Federal Reserve Bank at St. Louis.

December 2006 - Jan. 2007: Reviewer, National Sciences and Engineering Research Council of Canada.

Membership

American Mathematical Society

The American Finance Association

Society of Industrial and Applied Mathematics

Institute of Mathematical Statistics

Bachelier Finance Society

Miscellaneous Lectures

June 2007 Department of Mathematical Sciences and Statistics, University of Alberta. Edmonton. Canada.

April 2006 Department of Mathematics and Statistics, University of Northern Iowa. Cedar Falls, Iowa.

Dec. 2005 Department of System Engineering, The Chinese University of Hong Kong.

Nov. 2005 Department of Mathematics, Truman State University, Kirksville, Missouri.

University Administration

(i) University of Missouri:

Sept. 2005 - present Chair, Departmental Library Committee.

Nov. 2004 - June 2006 MU Library Task Force on Faculty Consultation.

March 2004. Review MU Research Board grant proposals.

Sept. 2003 - Aug. 2005 Co-chair, Departmental Library Committee.

Sept. 2003 - Sept. 2005 Graduate and Doctoral Faculty Review Committee.

Nov. 2003. Review MU Research Board grant proposal.

Sept. 2002 - Aug. 2003 Departmental Library Committee.

(ii) Hong Kong University of Science and Technology:

- Sept. 1998 - May 2000 Departmental liaison person for undergraduate program.
Sept. 1997 - Aug. 1998 Departmental liaison person for postgraduate and undergraduate program.
May 1998 - May 2000 Co-Chairman, Departmental Student-Staff Liaison Committee.
Sept. 1996 - Jun. 1998 Chairman, Departmental Student Consultation Committee.
Feb. 1995 - Aug. 1996 Departmental Undergraduate Committee.
Sept. 1991 - Aug. 1992 Departmental Postgraduate Committee.

Graduate Student Supervision

(A) University of Missouri:

- (i) Katie Uttke (M.S. in Math/Econ, Co-advisor, graduated in Spring, 2007);
(ii) Shangzhen Luo (Ph.D. advisor, Dept. of Mathematics, graduated in spring, 2005);
(iii) Yin Pei (Ph.D. advisor, Dept. of Mathematics, graduated in Spring, 2007);
(iv) Kevin Smith (M.Sc. advisor, Dept. of Mathematics, graduated in Spring, 2007);
(v) Temitope Ogunmola (M.Sc. advisor, Dept. of Mathematics, graduated in Spring, 2007);
(vi) Sabri Yilmaz (Ph.D. co-advisor, Dept. of Economics, in progress);
(vii) Georgiy Arutyunyants (Ph.D. research project, Dept. of Mathematics, graduated in spring, 2006);
(viii) Lianming Wang (Ph.D. committee, Dept. of Statistics, graduated in May 2006);
(ix) Hu Rusheng (Ph.D. committee, Dept. of Computer Science, graduated in spring, 2006);
(x) George Chikhladze (Ph.D. committee, Dept. of Economics, in progress);

- (xi) Melinda Maw (M.S. in Math/Econ, Co-Advisor, Dept. of Mathematics, graduated in May, 2006);
- (xii) Zhigang Zhang (Ph.D. committee, Dept. of Statistics, graduated in July 2004);
- (xiii) Michael Sleight (Ph.D. committee, Dept. of Finance, graduated in June 2003);
- (xiv) Yin Pei (advisor, M.S. in Math/Econ, graduated in Spring, 2003);
- (xv) Felix Katsman (advisor, M.S. in Math, graduated in December, 2003);
- (xvi) Sabri Yilmaz (advisor, M.S. in Math/Econ, graduated in December, 2004);
- (xvii) Emre Unlu (advisor, M.S. in Math/Econ, Department of Finance, graduated in spring, 2005);
- (xviii) George Chikhladze (M.S. committee in Math/Econ, Department of Economics, graduated in December, 2003).

(B) Hong Kong University of Science and Technology :

Bo Zhang (Ph.D.). Thesis title: Stability Theory of Stochastic Differential Systems. (Graduated in Aug. 1996)

Shu Ngai Yeung (M.Phil.). Thesis title: European Option Pricing when the Riskfree Interest Rate is Stochastic. (Graduated in Aug. 1997)

Carman Chan (M.Sc.). Project title: A Bank Loan Model and Optimal Control. (Graduated in Dec. 1996)

Graduate Courses Taught at the University of Missouri

- (a) Mathematical Finance
- (b) Markov Chains
- (c) Stochastic Filtering
- (d) Stochastic Processes
- (e) Advanced Probability Theory
- (f) Hidden Markov Models
- (g) Numerical Stochastic Differential Equation
- (h) Financial Filtering

- (i) Discrete Time Markov Control
- (j) Mathematical Risk Analysis in Actuarial Science
- (k) Financial Mathematics Seminar

Misc.

- WS2005 Taught an honor course with Lisa Reed.
- FS2005 Taught an honor course with Lindsey Hertich.
- WS2006 Taught an honor course with Daniel Saab.
- WS2007 Taught an honor course with Daniel Saab.
- WS2007 Taught a graduate reading course on Real Analysis.