TZE LEUNG LAI

Professor of Statistics

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Education

1967	University of Hong Kong, B.A. with First Class Honors
1970	Columbia University, M.A.
1971	Columbia University, Ph.D.

Professional Experience

1967–1968	Demonstrator of Mathematics, University of Hong Kong
1971–1974	Assistant Professor of Mathematical Statistics, Columbia University
1974–1977	Associate Professor of Mathematical Statistics, Columbia University
1975–1976	Visiting Associate Professor of Mathematics, University of Illinois
1977–1986	Professor of Mathematical Statistics, Columbia University
1979	Visiting Professor, Sonderforschungsbereich, Universität Heidelberg
1977–1981	Research Collaborator, Brookhaven National Laboratory
1983	Visiting Professor, Mathematical Sciences Research Institute, UC Berkeley
1985, 1989	Visiting Professor, Nankai Mathematics Institute, Nankai University
1977–1987	Statistical Consultant, Pediatric Pulmonary Division, Columbia Presbyterian Medical Center
1986–1987	Higgins Professor of Mathematical Statistics, Columbia University
1987–present	Professor of Statistics, Stanford University
1989–1993	External Examiner, National University of Singapore
1996–2006	Advisory Committee Member, National Health Research Institute, Taipei
1992–present	Advisory Committee Member, Institute of Statistical Science, Academia Sinica
1991–present	External Assessor, Chinese University of Hong Kong
1999–2014	Steering Committee Member, Interdisciplinary Program in Financial Mathematics, Stanford
2001–2004	Chair, Department of Statistics, Stanford
2005–2008	External Examiner, Risk Management Science Program, Chinese University of Hong Kong
2005–2008	Steering Committee Member, Methods of Analysis Program in the Social Sciences, Stanford
2005–2014	Director, Interdisciplinary Program in Financial Mathematics, Stanford
2005–present	Co-director, Biostatistics Core, Stanford Cancer Institute
2007–present	Professor, by courtesy, of Health Research and Policy, Stanford School of Medicine
2009–present	Professor, by courtesy, of the Institute of Computational and Mathematical Engineering, Stanford School of Engineering
2009–present	Co-director, Center for Innovative Study Design, Stanford School of Medicine
2010–present	International Advisory Committee Member, Center for Statistical Sciences, Peking University
2011–present	Advisory Board Member, Department of Statistics and Actuarial Sciences, University of Hong Kong
2011–present	Advisory Committee Member, Institute of Mathematical Research, University of Hong Kong
2011–present	Chair, Pao-Lu Hsu Distinguished Lecture Series in Statistics and Probability, Center for Mathematical Sciences, Tsinghua University, Beijing
2012–present	International Advisory Committee Member, Mathematical Sciences Center, Tsinghua University
2012–present	Director, Financial and Risk Modeling Institute, Stanford University
2014–present	Co-chair, Steering Committee, Mathematical and Computational Finance Program, Stanford

Professional Activities

1981–present	Editorial Board, *Sequential Analysis*
1977–2011	Editorial Board, *Journal of Statistical Planning and Inference*
1986–1989	Associate Editor, *Journal of The American Statistical Association*
1979–1986	Editorial Board, *Zeitschrift Wahrscheinlichkeitstheorie verw. Gebiete*
1987–1991	Editorial Board, *Probability Theory and Related Fields*
1977–1995	Editorial Board, *Journal of Multivariate Analysis*
1991–1999	Editorial Board, *Statistica Sinica*
2011–present	Co-chair, Advisory Board of FIPS (Finance, Insurance, Probability and Statistics) Section of Institute of Mathematical Statistics (IMS)

Memberships

Fellow, Institute of Mathematical Statistics
Fellow, American Statistical Association
Society of Financial Studies
Bernoulli Society
International Biometric Society
International Statistical Institute
International Chinese Statistical Association

Honors and Awards

1967	Chan Kai Ming Prize and Walter Brown Mathematics Prize, University of Hong Kong
1980	Special Invited Paper, Institute of Mathematical Statistics
1983–1984	John Simon Guggenheim Fellowship
1983	Committee of Presidents of Statistical Societies (COPSS) Award
1989	Y.C. Wong Lectures in Mathematical Sciences, University of Hong Kong
1994	Election to Academia Sinica
1999	Richard Anderson Lecture in Statistics, University of Kentucky
1999	Matsushita Lectures in Mathematical Finance, Fudan University
1999–2000	Center for Advanced Study in the Behavioral Sciences Fellowship
2001	C.V. Starr Lecture in Financial Mathematics, University of Hong Kong
2001	Distinguished Lecture Series in Statistical Science, Academia Sinica
2005	International Chinese Statistical Association Distinguished Achievement Award
2005	Abraham Wald Prize in Sequential Analysis
2010	Pao-Lu Hsu Lecture in Statistics, Peking University
2012	Saw Swee Hock Lecture in Statistics, University of Hong Kong
2013	Plenary Speaker, 9th International Chinese Statistical Association Conference
2014	Plenary Speaker, Fourth IMS Workshop on Finance, Insurance, Probability and Statistics

Books

1. T.L. Lai and D. Siegmund, eds. (1985). *Herbert Robbins: Selected Papers.* Springer-Verlag, Berlin.

2. T.L. Lai (1991). *Statistics: Inference and Decision* (in Chinese). University Mathematics Series, Luen-Ching Publishing Co., Taipei.

3. T.L. Lai and Z. Zheng (1993). *Survival Analysis* (in Chinese). Zhejiang Publishing House of Science and Technology, Hangzhou.

4. T.L. Lai, H. Yang and S.P. Yung, eds. (2004). *Probability, Finance and Insurance.* World Scientific, New Jersey.

5. H.C. Ho, C.K. Ing and T.L. Lai, eds. (2006). *Time Series and Related Topics. In Memory of Ching-Zong Wei.* IMS Lecture Notes–Monograph Series **52**.

6. T.L. Lai, L. Qian and Q. Shao, eds. (2007). *Asymptotic Theory in Probability and Statistics with Applications*. Higher Education Press and International Press, Beijing and Cambridge, MA.
7. T.L. Lai and H. Xing (2008). *Statistical Models and Methods in Financial Markets*. Springer, New York.
8. V. de la Peña, T.L. Lai and Q.M. Shao (2009). *Self-Normalized Processes: Limit Theory and Applications*. Probability and Its Applications. Springer, New York.
9. J. Bartroff, T.L. Lai and M.C. Shih (2013). *Sequential Experimentation in Clinical Trials: Design and Analysis*. Springer, New York.
10. T.L. Lai and H. Xing (2015). *Active Risk Management: Financial Models and Statistical Methods*, appearing in June from Chapman & Hall/CRC, Baton Rouge.
11. X. Guo, T.L. Lai, and Wong, S.P. (2015). *Quantitative Trading: Algorithms, Analytics, Data, Models and Optimization*, appearing in December from Chapman & Hall/CRC.
12. J. Chen, T.L. Lai and M.C. Shih (2016). *Statistical Methods for Medical Product Safety Evaluation*. Forthcoming from Chapman & Hall.
13. T.L. Lai, P.W. Lavori, and M.C. Shih (2016). *Innovative Study Designs and Statistical Analysis in Evidence-Based Medicine*. Forthcoming from Chapman & Hall.

Publications

1. (1973) Space-time processes, parabolic functions and one-dimensional diffusions. *Trans. Amer. Math. Soc.* **175**, 409–438.
2. (1973) Optimal stopping and sequential tests which minimize the maximum expected sample size. *Ann. Statist.* **1**, 659–673.
3. (1973) Limiting behavior of weighted sums of independent random variables. *Ann. Probab.* **1**, 810–824 (with Y.S. Chow).
4. (1973) Gaussian processes, moving averages and quick detection problems. *Ann. Probab.* **1**, 825–837.
5. (1973) On Strassen-type laws of the iterated logarithm for delayed averages of the Wiener process. *Bull. Inst. Math., Academia Sinica* **1**, 29–39.
6. (1974) Control charts based on weighted sums. *Ann. Statist.* **2**, 134–147.
7. (1974) Limit theorems for delayed sums. *Ann. Probab.* **2**, 432–440.
8. (1974) Martingales and boundary crossing probabilities for Markov processes. *Ann. Probab.* **2**, 1152–1167.
9. (1974) Reproducing kernel Hilbert spaces and the law of the iterated logarithm for Gaussian processes. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **29**, 7–19.
10. (1974) Summability methods for independent, identically distributed random variables. *Proc. Amer. Math. Soc.* **45**, 253–261.
11. (1974) Convergence rates in the strong law of large numbers for random variables taking values in Banach spaces. *Bull. Inst. Math., Academia Sinica* **2**, 67–85.
12. (1975) One-sided theorems on the tail distribution of sample sums with applications to the last time and largest excess of boundary crossings. *Trans. Amer. Math. Soc.* **208**, 51–72 (with Y.S. Chow).
13. (1975) Termination, moments and exponential boundedness of the stopping rule for certain invariant sequential probability ratio tests. *Ann. Statist.* **3**, 581–598.
14. (1975) On Chernoff-Savage statistics and sequential rank tests. *Ann. Statist.* **3**, 825–845.
15. (1975) A note on first exit times with applications to sequential analysis. *Ann. Statist.* **3**, 999–1005.
16. (1975) Uniform integrability in renewal theory. *Bull. Inst. Math., Academia Sinica* **3**, 99–105.
17. (1976) Asymptotic moments of random walks with applications to ladder variables and renewal theory. *Ann. Probab.* **4**, 51–66.

18. (1976) Maximally dependent random variables. *PNAS USA* **73**, 286–288 (with H. Robbins). doi: 10.1073/pnas.73.2.286
19. (1976) On confidence sequences. *Ann. Statist.* **4**, 265–280.
20. (1976) Boundary crossing probabilities for sample sums and confidence sequences. *Ann. Probab.* **4**, 299–312.
21. (1976) On the last time and the number of boundary crossings related to the strong law of large numbers and the law of the iterated logarithm. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **34**, 59–71 (with K.K. Lan).
22. (1976) On r-quick convergence and a conjecture of Strassen. *Ann. Probab.* **4**, 612–627.
23. (1976) Uniform Tauberian theorems and their applications to renewal theory and first passage problems. *Ann. Probab.* **4**, 612–627.
24. (1977) First exit times from moving boundaries for sums of independent random variables. *Ann. Probab.* **5**, 210–221.
25. (1977) Sequential decision about a normal mean. In *Statistical Decision Theory and Related Topics II* (S.S. Gupta, ed.), 213–221. Academic Press, New York (with H. Robbins and D. Siegmund).
26. (1977) Power-one tests based on sample sums. *Ann. Statist.* **5**, 866–880.
27. (1977) Strong consistency of least-squares estimates in regression models. *PNAS USA* **74**, 2667–2669 (with H. Robbins). doi: 10.1073/pnas.74.7.2667
28. (1977) A non-linear renewal theory with applications to sequential analysis I. *Ann. Statist.* **5**, 946–954 (with D. Siegmund).
29. (1977) Convergence rates and r-quick versions of the strong law for stationary mixing sequences. *Ann. Probab.* **5**, 693–706.
30. (1978) Pitman efficiencies of sequential tests and uniform limit theorems in nonparametric statistics. *Ann. Statist.* **6**, 1027–1047.
31. (1978) Adaptive design in regression and control. *PNAS USA* **75**, 586–587 (with H. Robbins). doi: 10.1073/pnas.75.2.586
32. (1978) Limit theorems for weighted sums and stochastic approximation processes. *PNAS USA* **75**, 1068–1070 (with H. Robbins). doi: 10.1073/pnas.75.3.1068
33. (1978) A class of dependent random variables and their maxima. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **42**, 89–111 (with H. Robbins). doi: 10.1007/BF00536046
34. (1978) Paley-type inequalities and convergence rates related to the law of large numbers and extended renewal theory. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **45**, 1–19 (with Y.S. Chow).
35. (1978) The law of the iterated logarithm and upper-lower class tests for partial sums of stationary Gaussian sequences. *Ann. Probab.* **6**, 731–750 (with W. Stout).
36. (1978) Strong consistency of least squares estimates in multiple regression. *PNAS USA* **75**, 3034–3036 (with H. Robbins and C.Z. Wei). doi: 10.1073/pnas.75.7.3034
37. (1979) Sequential tests for hypergeometric distributions and finite populations. *Ann. Statist.* **7**, 46–59.
38. (1979) A non-linear renewal theory with applications to sequential analysis II. *Ann. Statist.* **7**, 60–76 (with D. Siegmund).
39. (1979) Extended renewal theory and moment convergence in Anscombe's theorem. *Ann. Probab.* **7**, 304–318 (with Y.S. Chow and C.A. Hsiung).
40. (1979) On the first exit time of a random walk from the stopping bounds $f(n) \pm cg(n)$ with applications to obstructive distributions in sequential analysis. *Ann. Probab.* **7**, 672–692 (with R.A. Wijsman).
41. (1979) Moments of ladder variables for driftless random walks. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **48**, 253–257 (with Y.S. Chow).
42. (1979) Local convergence theorems for adaptive stochastic approximation schemes. *PNAS USA* **76**, 3065–3067 (with H. Robbins). doi: 10.1073/pnas.76.7.3065
43. (1979) Adaptive design and stochastic approximation. *Ann. Statist.* **7**, 1196–1221 (with H. Robbins). doi: 10.1214/aos/1176344840

44. (1979) Strong consistency of least squares estimates in multiple regression II. *J. Multivariate Anal.* **9**, 343–361 (with H. Robbins and C.Z. Wei). doi: 10.1016/0047-259X(79)90093-9

45. (1979) On the maximal excess in boundary crossings of random walks related to fluctuation theory and laws of large numbers. *Bull. Inst. Math., Academia Sinica* **7**, 271–289 (with Y.S. Chow).

46. (1980) Limit theorems for sums of dependent random variables. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **51**, 1–14 (with W. Stout).

47. (1980) On random Fourier series. *Trans. Amer. Math. Soc.* **261**, 53–80 (with J. Cuzick).

48. (1980) Sequential medical trials. *PNAS USA* **79**, 3135–3138 (with B. Levin, H. Robbins and D. Siegmund).

49. (1980) Sequential selection procedures based on confidence sequences for normal populations. *Commun. Statist.–Theor. Method.* **9**, 1657–1676 (with S.C. Kao).

50. (1980) Heart rate and heart rate variability during sleep in aborted sudden infant death syndrome. *J. Pediatrics* **97**, 51–55 (with R.A. Epstein, M.A.F. Epstein, G.G. Haddad, H.L. Leistner and R.B. Mellins).

51. (1981) Ventilation and ventilatory patterns during sleep in aborted SIDS infants. *Pediatric Research* **15**, 879–883 (with G.G. Haddad, H.L. Leistner and R.B. Mellins).

52. (1981) Asymptotic optimality of invariant sequential probability ratio tests. *Ann. Statist.* **9**, 318–333.

53. (1981) Consistency and asymptotic efficiency of slope estimates in stochastic approximation schemes. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **56**, 329–360 (with H. Robbins). doi: 10.1007/BF00536178

54. (1981) Convergence systems and strong consistency of least squares estimates in regression models. *J. Multivariate Anal.* **11**, 319–333 (with G.C. Chen and C.Z. Wei). doi: 10.1016/0047-259X(81)90078-6 [Reprinted (1983) in *Kexue Tongbao* **28**, 16–20. WOS: A1983QF00600004]

55. (1982) A law of the iterated logarithm for double arrays of independent random variables with applications to regression and time series models. *Ann. Probab.* **10**, 320–335 (with C.Z. Wei). doi: 10.1214/aop/1176993860

56. (1982) Least squares estimates in stochastic regression models with applications to identification and control of dynamic systems. *Ann. Statist.* **10**, 154–166 (with C.Z. Wei). doi: 10.1214/aos/1176345697

57. (1982) Adaptive design and the multiperiod control problem. In *Statistical Decision Theory and Related Topics III* (S.S. Gupta, ed.), Vol. 2, 103–120. Academic Press, New York (with H. Robbins).

58. (1982) Breath-to-breath variations in rate and depth of ventilation in sleeping infants. *Amer. J. Physiology* **243**, R164–R169 (with G.G. Haddad, M.A.F. Epstein, R.A. Epstein, H.L. Leistner, R.B. Mellins and K.F. Yu).

59. (1982) Iterated least squares in multiperiod control. *Adv. Appl. Math.* **3**, 50–73 (with H. Robbins).

60. (1982) Asymptotic properties of projections with applications to stochastic regression problems. *J. Multivariate Anal.* **12**, 346–370 (with C.Z. Wei). doi: 10.1016/0047-259X(82)90071-9

61. (1982) Determination of ventilatory pattern during REM sleep in normal infants. *J. Appl. Physiology* **53**, 52–56 (with G.G. Haddad and R.B. Mellins).

62. (1982) Convergence properties of some recursive identification schemes and adaptive predictors. In *Proc. Amer. Control Conf.*, 176–180 (with C.Z. Wei and Y.G. Zhang).

63. (1983) Lacunary systems and generalized linear processes. *Stochastic Processes and Applications* **14**, 187–199 (with C.Z. Wei).

64. (1983) Stochastic regression models and consistency of the least squares identification scheme. In *Mathematical Learning Models – Theory and Algorithms* (U. Herkenrath, D. Kalin and W. Vogel, eds.), 118–125. Springer-Verlag, Berlin.

65. (1983) Some asymptotic properties of general autoregressive models and strong consistency of least squares estimates of their parameters. *J. Multivariate Anal.* **13**, 1–23 (with C.Z. Wei). doi: 10.1016/0047-259X(83)90002-7

66. (1983) Fixed accuracy estimation of an autoregressive parameter. *Ann. Statist.* **11**, 478–485 (with D. Siegmund).

67. (1983) Sequential design of comparative clinical trials. In *Recent Advances in Statistics* (J. Rustagi et al., eds.), 51–68. Academic Press, New York (with H. Robbins and D. Siegmund).

68. (1983) A note on martingale difference sequences satisfying the local Marcinkiewicz–Zygmund condition. *Bull. Inst. Math., Academia Sinica* **11**, 1–13 (with C.Z. Wei).

69. (1983) Enkephalin-induced changes in ventilation and ventilatory pattern in unanesthetized adult dogs. *J. Appl. Physiology* **15**, 1311–1320 (with G.G. Haddad, M.R. Gandhi and G.M. Hochwald).

70. (1983) Adaptive choice of mean or median in estimating the center of a symmetric distribution. *PNAS USA* **80**, 5803–5806 (with H. Robbins and K.F. Yu). doi: 10.1073/pnas.80.18.5803

71. (1983) Heart rate pattern during sleep in congenital prolongation of the QT interval (Romano-Ward Syndrome). *Chest* **84**, 191–194 (with G.G. Haddad, H.L. Leistner and R.B. Mellins).

72. (1984) Moment inequalities with applications to regresion and time series models. In *IMS Monograph Series: Inequalities in Statistics and Probability* (Y.L. Tong, ed.) **5**, 165–172 (with C.Z. Wei).

73. (1984) Optimal sequential sampling from two populations. *PNAS USA* **81**, 1284–1286 (with H. Robbins). doi: 10.1073/pnas.81.4.1284

74. (1984) Asymptotically optimal allocation of treatments in sequential experiments. In *Design of Experiments, Ranking and Selection: Essays in Honor of Robert E. Bechhofer* (T.J. Santner and A.C. Tamhane, eds.), 127–142. Marcel Dekker, New York (with H. Robbins).

75. (1984) Incorporating scientific and economic considerations in the design of clinical trials in the pharmaceutical industry — A sequential approach. *Commun. Statist.–Theor. Method.* **13**, 2355–2368.

76. (1984) Rhythmic variations in the RR interval during sleep and wakefulness in puppies and dogs. *Amer. J. Physiology: Heart and Circulatory Physiology* **247**, H67–H73 (with G.G. Haddad, H.J. Jeng and S.H. Lee).

77. (1984) Some thoughts on stochastic adaptive control. In *Proc. 23rd IEEE Conf. Decision and Control* **1**, 51–56.

78. (1985) Asymptotic properties of multivariate weighted sums with applications to stochastic regression and linear dynamic systems. In *Multivariate Analysis VI* (P.R. Krishnaiah, ed.), North Holland Publishing Company, Amsterdam, 375–393 (with C.Z. Wei).

79. (1985) Asymptotically efficient adaptive allocation rules. *Adv. Appl. Math.* **6**, 4–22 (with H. Robbins). doi: 10.1016/0196-8858(85)90002-8

80. (1985) Stochastic approximation and sequential search for optimum. In *Proc. Berkeley Conf. in Honor of Jerzy Neyman and Jack Kiefer* (L. LeCam and R.A. Olshen, eds.) **2**, 557–577. Wadsworth, Monterey.

81. (1985) Orthonormal Banach systems with applications to linear processes. *Z. Wahrscheinlichkeitstheorie verw. Gebiete* **70**, 381–394 (with C.Z. Wei). doi: 10.1007/BF00534870

82. (1985) Regression analysis of compartmental models. *NBS J. Research* **90**, 525–530.

83. (1986) On the concept of excitation in least squares identification and adaptive control. *Stochastics* **16**, 227–254 (with C.Z.Wei).

84. (1986) Asymptotically efficient adaptive control in stochastic regression models. *Adv. Appl. Math.* **7**, 23–45.

85. (1986) The contributions of Herbert Robbins to mathematical statistics. *Statist. Sci.* **1**, 276–284 (with D. Siegmund).

86. (1986) Effect of endorphins on heart rate and blood pressure in adult dogs. *Amer. J. Physiology: Heart and Circulatory Physiology* **250**: H796–H805 (with G.G. Haddad and H.J. Jeng).

87. (1986) Extended least squares and their applications to adaptive control and prediction in linear systems. *IEEE Trans. Automat. Contr.* **31**, 898–906 (with C.Z. Wei). WOS: A1986D920600003

88. (1986) Stochastic approximation and adaptive control. In *Adaptive Statistical Procedures and Related Topics* (J. Van Ryzin, ed.), IMS Lecture Notes–Monograph Series, **8**, 266–282.

89. (1986) Within-breath EMG changes during loaded breathing in adult sheep. *Amer. J. Physiology* **61**, 1316–1321 (with G.G. Haddad, H.J. Jeng and A. Bazzy).

90. (1987) Asymptotically efficient self-tuning regulators. *SIAM J. Contr. Optimizat.* **25**, 466–481 (with C.Z. Wei). doi: 10.1137/0325026

91. (1987) Adaptive treatment allocation and the multi-armed bandit problem. *Ann. Statist.* **15**, 1091–1114.

92. (1987) Determination of sleep state in infants using respiratory variability. *Pediatric Research* **21**, 556–562 (with G.G. Haddad, H.J. Jeng and R.B. Mellins).

93. (1987) Heart rate variability during respiratory pauses in puppies and dogs. *Pediatric Research* **22**, 306–331 (with G.G. Haddad and H.J. Jeng).

94. (1987) Optimal stopping and dynamic allocation. *Adv. Appl. Probab.* **19**, 829–853 (with F. Chang).

95. (1988) On Bayes sequential tests. In *Statistical Decision Theory and Related Topics IV* (S.S. Gupta and J. Berger, eds.) **2**, 131–143. Springer-Verlag, Berlin.

96. (1988) Asymptotic solutions of bandit problems. In *Stochastic Differential Systems, Stochastic Control Theory and Applications* (W. Fleming and P.L. Lions, eds.), 275–292. Springer-Verlag, Berlin.

97. (1988) Boundary crossing problems for sample means. *Ann. Probab.* **16**, 375–396.

98. (1988) Nearly optimal sequential tests of composite hypotheses. *Ann. Statist.* **16** 856–886.

99. (1988) Open bandit processes and optimal scheduling of queueing networks. *Adv. Appl. Probab.* **20**, 447–472 (with Z. Ying).

100. (1988) Stochastic integrals of empirical-type processes with applications to censored regression. *J. Multivariate Anal.* **27**, 334–358 (with Z. Ying).

101. (1989) Extended stochastic Lyapunov functions and recursive algorithms in stochastic linear systems. In *Stochastic Differential Systems: Proc. 4th Bad Honnef Conf.* (N. Christopeit et al., eds.), 206–220. Springer-Verlag, Berlin.

102. (1990) Functional laws of the iterated logarithm for the product-limit estimator of a distribution function under random censorship or truncation. *Ann. Probab.* **18**, 160–189 (with M.G. Gu).

103. (1990) T.W. Anderson and the strong consistency of least squares estimators in dynamic models. In *The Collected Papers of T.W. Anderson: 1943–1985* (G.P.H. Styan, ed.), 1615–1617. Wiley, New York.

104. (1991) Asymptotic optimality of generalized sequential likelihood ratio tests in some classical sequential testing problems. In *Handbook of Sequential Analysis* (B.K. Ghosh and P.K. Sen, eds.), 121–144. Marcel Dekker, New York. (2002) Reprinted in *Sequential Anal.* **21**, 219–247.

105. (1991) Adaptive prediction in nonlinear autoregressive models and control systems. *Statistica Sinica* **1**, 309–334 (with G. Zhu).

106. (1991) Estimating a distribution function with truncated and censored data. *Ann. Statist.* **19**, 160–189 (with Z. Ying).

107. (1991) Rank regression methods for left-truncated and right-censored data. *Ann. Statist.* **19**, 531–556 (with Z. Ying).

108. (1991) Large sample theory of a modified Buckley–James estimator for regression analysis with censored data. *Ann. Statist.* **19**, 1370–1402 (with Z. Ying).

109. (1991) Weak convergence of time-sequential censored rank statistics with applications to sequential testing in clinical trials. *Ann. Statist.* **19**, 1403–1433 (with M.G. Gu).

110. (1991) Recursive identification and adaptive prediction in linear stochastic systems. *SIAM J. Contr. Optimizat.* **29**, 1061–1090 (with Z. Ying).

111. (1991) Parallel recursive algorithms in asymptotically efficient adaptive control of linear stochastic systems. *SIAM J. Contr. Optimizat.* **29**, 1091–1127 (with Z. Ying).

112. (1991) Some almost sure convergence properties of weighted sums of martingale difference sequences. In *Proc. Conf. on Almost Everywhere Convergence in Probability and Ergodic Theory II* (A. Bellow and R. Jones, eds.), 179–190. Academic Press, New York.

113. (1991) Information bounds, certainty equivalence and learning in asymptotically efficient adaptive control of time-invariant stochastic systems. In *Stochastic Systems, Modelling, Estimation and Adaptive Control* (L. Gerenesér and P.E. Caines, eds.), 335–368. Springer-Verlag, Berlin.

114. (1991) Rank tests based on censored data and their sequential analogues. *Amer. J. Math. Manag. Sci.* **11**, 147–176 (with M.G. Gu and K.K.G. Lan).

115. (1992) Linear rank statistics in regression analysis with censored or truncated data. *J. Multivariate Anal.* **40**, 13–45 (with Z. Ying).

116. (1992) Recursive solutions of estimating equations and adaptive spectral factorization. *IEEE Trans. Automat. Contr.* **37**, 240–243 (with Z. Ying).

117. (1992) Asymptotically efficient estimation in censored and truncated regression models. *Statistica Sinica* **2**, 17–46 (with Z. Ying).

118. (1992) Recursive estimation in ARMAX models. In *New Directions in Time Series Part II* (D. Brillinger, P. Caines, J. Geweke, E. Parzen, M. Rosenblatt, M. Taqqu, eds.), 263–288. Springer-Verlag, Berlin.

119. (1992) Bootstrap confidence bands for spectra and cross-spectra. *IEEE Trans. Signal Process.* **40**, 1206–1215 (with D. Politis and J. Romano).

120. (1992) Asymptotic theory of a bias-corrected least squares estimator in truncated regression. *Statistica Sinica* **2**, 519–539 (with Z. Ying).

121. (1992) Certainty equivalence with uncertainty adjustments in stochastic adaptive control. In *Stochastic Theory and Adaptive Control* (T. Duncan and B. Pasik-Duncan, eds.), 270–284. Springer-Verlag, Berlin.

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126. (1994) A modification of Schwarz's sequential likelihood ratio tests in multivariate sequential analysis. *Sequential Anal.* **13**, 79–96 (with L. Zhang).

127. (1994) Asymptotic expansions of stopped random walks and first passage times. *Ann. Probab.* **22**, 1957–1992 (with J.Q. Wang).

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283. (2015) Asymptotically efficient parameter estimation in hidden Markov spatio-temporal random fields. *Statistica Sinica* **25**, 403–421 (with J. Lim). doi: 10.5705/ss.2013.281w

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289. (2015) Fixed-size confidence regions in high-dimensional sparse linear regression models. To appear *Sequential Anal.* (with C.K. Ing).

290. (2015) Adaptive design of a point-of-care comparative effectiveness trial for stroke prevention in atrial fibrillation. To appear *Contemp. Clin. Trials* (with M.C. Shih and M. Turakhia).

291. (2015) Model and moment selection in moment restriction models. To appear *Economet. Theory* (with D. Small and Y. Su).

292. (2015) Regression models of big data for root-cause identification with applications to semiconductor manufacturing. Submitted *Technometrics* (with H.L. Hsu, C.K. Ing, M. Shen and S.H. Yu).

Doctoral Students and Their Ph.D. Dissertations

At Columbia University

1. GIAN-CARLO MANGANO (1974). On Strassen-type laws of the iterated logarithm for Gaussian random variables with values in abstract spaces.
2. YUNG KUNG MENG (1975). Treatment allocation problems and sequential tests in clinical trials.
3. KUANG HSIEN LIN (1976). Large deviation probabilities for U-statistics with applications to sequential analysis.
4. JOHN GEBBED KASHAH (1979). Fixed size confidence regions for certain time series parameters.
5. CHING ZONG WEI (1980). Limit theorems for weighted sums with applications to regression and time series models.
6. LANCELOT WU (1982). On recursive estimation, adaptive filtering, and stochastic approximation.
7. FU CHANG (1983). Contributions to the multi-armed bandit problem.
8. ZUKANG ZHENG (1984). Regression analysis with censored data.
9. HUAJING JENG (1985). Contributions to spectral analysis with applications to electromyographic data.
10. CHUN JIAN TIAN (1986). Statistical analysis of periodically correlated time series.
11. WEI-QIU WU (1986). Stochastic approximation and sequential minimization under constraints.
12. ZHILIANG YING (1987). Recursive estimation and adaptive control in dynamic systems and time series models.
13. MINGGAO GU (1987). Nonparametric analysis of survival data in staggered entry clinical trials.

At State University of New York at Stony Brook

14. ZUEI-CHUAN LIN (1981). Sequential hypothesis testing in a normal population with unknown variance.

At University of Padova, Italy

15. MONICA BREZZI (1998). Sequential learning and nearly optimal rules in dynamic allocation.

At Stanford University

16. QIZHI WANG (1991). Edgeworth expansions and bootstrap methods in survival analysis.
17. GUANGRUI ZHU (1992). Least squares estimation and adaptive prediction in non-linear stochastic regression models with applications to time series and stochastic systems.
18. LIMIN ZHANG (1994). Asymptotically optimal sequential tests of linear hypotheses in exponential families.
19. CHUL-KI KIM (1995). Nonparametric regression for censored and truncated data.
20. FARID AITSAHLIA (1995). Optimal stopping and weak convergence methods for some problems in financial economics.
21. ZHAOLIN SHAN (1995). Sequential detection of parameter changes in linear dynamic systems and regression models.

22. CHIN-SHAN CHUANG (1995). Estimation with resampling after sequential tests.
23. TODD LAWRENCE GRAVES (1995). Comparison of treatments under adaptive treatment allocation in clinical trials and stochastic adaptive control.
24. JINHO PARK (1995). Nonparametric function estimation with left truncated and right censored data.
25. SAMUEL PO-SHING WONG (1996). Stochastic neural networks and their applications to regression analysis and time series forecasting.
26. HOCK PENG CHAN (1998). Boundary crossing theory in change-point detection and its applications.
27. TIONG-WEE LIM (1998). Recursive integration and optimal stopping: Applications to option pricing.
28. MEI-CHIUNG SHIH (1999). Estimation in nonlinear mixed effects models: Parametric and nonparametric approaches.
29. VIKTOR SPIVAKOVSKY (2000). Multiperiod control in stochastic regression models.
30. JULIA TUNG (2000). Parameter estimation in stochastic volatility models and hidden Markov chains.
31. TONGWEI LIU (2000). Segmentation and estimation in stochastic systems with occasional parameter changes.
32. YUGUO CHEN (2001). Sequential importance sampling with resampling: Theory and applications.
33. WENZHI LI (2001). Confidence intervals following group sequential trials with random group sizes and applications to survival analysis.
34. DYLAN SMALL (2002). Inference and model selection for instrumental variables regression.
35. HAIYAN LIU (2002). Autoregressive models with time-varying parameters and applications to financial time series.
36. JOHAN LIM (2003). Hidden variable models and their applications.
37. SERGIY TERENTYEV (2004). Asymptotic counterparty relations in default modeling.
38. QINGFENG ZHANG (2004). A basis function approach to interest rate derivative valuation.
39. MATTHEW FINKELMAN (2004). Statistical issues in computerized adaptive testing.
40. ZHENG SU (2005). Computational methods for least squares problems and survival analysis.
41. HAIPENG XING (2005). Change-point stochastic regression models with applications to econometric time series.
42. JIARUI HAN (2005). Dynamic portfolio management: An approximate linear programming approach.
43. JINGYANG LI (2005). A Bayesian approach to efficient estimation with censored survival data.
44. WEI JIN (2006). A Bayesian approach for additive-multiplicative hazard models.
45. JAEMYOUNG KIM (2007). Pricing and hedging bond options in the presence of transaction costs.
46. ZEHAO CHEN (2008). Estimation of high-dimensional covariance matrices and applications to portfolio selection.
47. ZHEN WEI (2008). Functional learning methods with applications to quantitative finance.
48. YUXUE JIN (2009). Regression modeling of competing risks with applications to bone marrow transplantation studies and mortgage prepayment and default behavior.
49. JIA LIU (2010). Econometric analysis of policy effect.
50. BO SHEN (2010). Evaluation of forecasts with applications to meteorology.

51. LING CHEN (2010). A semiparametric approach to option pricing and hedging with transaction costs.
52. SHAOJIE DENG (2010). Sequential methods for rare event simulation: Theory and applications.
53. PAUL C.K. PONG (2010). Interest rate modeling and a time series model for functional data.
54. HOWARD SHEK (2011). Statistical and algorithmic aspects of optimal portfolios.
55. KEVIN BIN WU (2011). An integrated approach to robotic navigation under uncertainty.
56. KEVIN HAOYU SUN (2011). Dynamic empirical Bayes models and their applications to longitudinal data.
57. FENG ZHANG (2011). Cross-validation and regression analysis in high-dimensional sparse linear models.
58. HONGSONG YUAN (2012). Regularization methods and algorithms for noisy output signals and high-dimensional input vectors.
59. SHILIN ZHU (2012). Probabilistic and statistical modeling of fixed income assets.
60. OLIVIA YUEH WEN LIAO (2012). Adaptive design of clinical trials with interim selection of treatment arm.
61. PEI HE (2012). Non-proportional hazards in clinical trials with failure-time endpoints.
62. YONG SU (2013). Statistical methods for dynamic panel data and their applications.
63. LI XU (2013). Dynamic asset allocation using adaptive particle filters.
64. VIBHAV BUKKAPATANAM (2013). Statistical and computational methods for credit portfolio loss and state-space models.
65. ABHAY SUBRAMANIAN (2013). An adaptive filtering approach to problems in high-frequency trading.
66. DONG WOO KIM (2014). Multi-armed bandits with side information.
67. TONG XIA (2014). Gradient boosting machine for high-dimensional additive models.
68. KA WAI TSANG (2015). High-dimensional sparse multivariate regression models.
69. SUKWON CHUNG (2015). Adaptive particle filters for high signal-to-noise ratios with applications to robotics.
70. ANDY GEWITZ (2015). A sequential Monte Carlo approach to joint longitudinal and time-to-event modeling.

Postdoctoral Trainees and Their Subsequent Positions

1. HUAJING JENG (1985–1986). Member of Technical Staff, AT&T Bell Laboratories.
2. FRIDRIK BAULDURSSON (1985–1987). Assistant Professor, University of Iceland.
3. MEI-CHIUNG SHIH (2000–2001). Assistant Professor, Department of Biostatistics, Harvard University.
4. WERNER BRANNATH (2002–2003). Assistant Professor, Medical University of Vienna.
5. JAY BARTROFF (2004–2006). Assistant Professor, Department of Statistics, University of California at Riverside.
6. ZHENG SU (2005–2006). Assistant Professor, Department of Applied Mathematics and Statistics, State University of New York at Stony Brook.