CURRICULUM VITAE

Murray Aitkin

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Education

BSc	Mathematical Statistics	1961	Sydney University
PhD	Mathematical Statistics	1966	Sydney University
DSc	Mathematical Statistics	1997	Sydney University

Professional Appointments

2000 – 2002	Chief Statistician, Education Statistics Services Institute, American Institutes for Research, Washington DC (on leave from Newcastle)
1996 – 2000	Director, Statistical Consultancy Service, University of Newcastle
1996 – 2004	Professor, Department of Statistics, University of Newcastle UK
1994 – 1996	Adjunct Professor, Department of Mathematics, University of Western Australia
1992 – 1996	ARC Senior Research Fellow, Department of Mathematics, University of Western Australia
1992	ARC Senior Research Fellow, Centre for Mathematics and its Applications, Australian National University

1989 – 1991	Director, Statistical Laboratory, Department of Statistics and Operations Research, School of Mathematical Sciences, Tel Aviv University
1988 – 1995	Professor, Department of Statistics and Operations Research, School of Mathematical Sciences, Tel Aviv University (on leave 1992-5)
1979 – 1987	Professor of Applied Statistics and Director, Centre for Applied Statistics, University of Lancaster
1976 – 1979	SSRC Professorial Fellow in Statistics Applied to the Social Sciences, Department of Mathematics, University of Lancaster
1969 – 1976	Senior Lecturer, School of Behavioural Sciences/School of Economic and Financial Studies, Macquarie University
1967 – 1968	Lecturer, Department of Statistics, University of New South Wales
1961 – 1964	Teaching Fellow, Department of Mathematical Statistics, Sydney University

Membership in Professional Societies

- International Statistical Institute (elected 1982)
- American Statistical Association (Fellow 1984)
- Statistical Society of Australia (President, WA Branch 1995)
- International Biometric Society
- Royal Statistical Society
- Statistical Society of Australia and New Zealand

Editorial Responsibilities

- Honorary member of Editorial Advisory Board, Statistical Modelling: An International Journal
- Former Consulting Editor of Multivariate Behavioral Research
- Former Associate Editor of:
  - Journal of the Royal Statistical Society Series B
  - Psychometrika
  - British Journal of Mathematical and Statistical Psychology
  - Journal of Educational Statistics
  - Biometrics

Visiting Appointments

4/2008 –	Honorary Professorial Associate, School of Mathematics and Statistics, University of Melbourne
10/2004 – 3/2008	Honorary Professorial Fellow, Department of Psychology, University of Melbourne
7/1991 – 12/1991	Visiting Professor, Department of Statistics, Australian National University
6/1990 – 8/1990	Visiting Professor, Department of Applied Mathematics and Statistics, State University of New York at Stony Brook
7/1989 – 8/1989	Visiting Professor, Department of Biostatistics, School of Public Health, Johns Hopkins University
8/1987 – 7/1988	Visiting Scholar, Division of Statistical and Psychometric Research and Services, Educational Testing Service, Princeton
8/1986 – 7/1987	Visiting Professor, Department of Statistics, School of Mathematical Sciences, Tel Aviv University
7/1971 – 6/1972	Visiting Research Fellow (Fulbright Senior Fellow), Psychometric Research Group, Educational Testing Service, Princeton
1/1966 – 6/1967	Visiting Assistant Professor, Psychometric Laboratory, University of North Carolina at Chapel Hill
7/1964 – 12/1965	Visiting Assistant Professor, Department of Statistics Virginia Polytechnic Institute

Computational Responsibilities

- Chairman, Users' Committee, UK Computer Board 1979-80.
- Chairman, GLIM Working Party of the Royal Statistical Society 1985-86.

Honours and Distinctions

- 1971-2 Fulbright Senior Fellow, Educational Testing Service, Princeton
- 1976-9 UK Social Science Research Council Professorial Fellow, University of Lancaster
- 1982 Elected member, International Statistical Institute
- 1984 Fellow, American Statistical Association

- 1992-6 Australian Research Council Senior Research Fellow, Australian National University and University of Western Australia
- President, Western Australia Branch, Statistical Society of Australia 1995
- Doctor of Science, Sydney University 1997
- Emeritus Professor, University of Newcastle-upon-Tyne 2004
- Statistical Modelling and Inference Conference to celebrate Murray Aitkin's 70th birthday, Queensland University of Technology, 2-4 February 2010
- Simon Visiting Professor, University of Manchester, September 2016
- Honorary Member, Statistical Modelling Society, July 2019

Invited conference presentations 1999 –

- 10th Anniversary conference, University Centre for Statistics, University of Leuven 29-30 April, 1999.
- Measurement Error and Missing Data conference, Department of Statistics, University of Munich 12-14 July, 2000.
- Euroworkshop on Statistical Modelling, Munich 2-5 November, 2000.
- Mixtures conference, Edinburgh 28-30 March, 2001.
- Mixtures conference, Hamburg 24-28 July, 2001.
- International Workshop on Mixtures, Case Western Reserve University, Cleveland 2-4 June, 2002.
- Mixtures workshop, Department of Probability and Applied Statistics, University La Sapienza, Rome 10-13 September, 2002.
- Modern Bayesian Methods (session organiser), International Statistical Institute, Sydney 5-12 April, 2005.
- Bayesian Days in the Tropics, Stradbroke Island, Queensland 28-30 September, 2005.
- Modelling the Upper Level in Multi-Level Models (session organiser), Compstat, Rome 28 August-1 September, 2006.

- Special session on Official Statistics, OBayes6, University La Sapienza, Rome 8-12 June, 2007.
- Keynote speaker, ASEARC (Applied Statistics Education and Research Collaboration) conference, University of Western Sydney 10-11 December, 2007.
- Short course, New Bayesian methods for Model Comparison, International Workshop on Statistical Modelling, Cornell University 19 July, 2009.
- Short course, New Bayesian methods for Model Comparison, Queensland University of Technology 1 February, 2010.
- Statistical Modelling and Inference Conference to celebrate Murray Aitkin's 70th birthday, Queensland University of Technology, 2-4 February 2010.
- Mixtures conference, Edinburgh 3-5 March, 2010.
- Short course, New Bayesian methods for Model Comparison, DAG meeting (combined German statistical societies) Dortmund 22 March, 2010.
- Short course, New Bayesian methods for Model Comparison, University of Lancaster 29 March, 2010.
- Royal Statistical Society meeting, London 15 April, 2010.
- Keynote speaker, 25th International Workshop in Statistical Modelling, Glasgow 5-9 July, 2010.
- Conference on Applied Statistics in Ireland, Galway 18-20 May, 2011.
- Italian Biometric Society annual meeting, Gargnano 27-29 June, 2011.
- Colloquium, Penn State University, State College PA 13 March, 2012.
- International Society for Bayesian Analysis meeting, Varanasi India 6-10 January, 2013.
- Symposium on Bayes for Official Statistics, ABS House Canberra 16 October, 2013.
- European Courses in Advanced Statistics Workshop on Social Network Analysis, Munich Germany September 28-October 2 2015.

Research Grants

UK Economic and Social Research Council

- 1979-1980 £5K. Project grant (joint with Neville Bennett) for reanalysis of the Teaching Styles data.
- 1979-1985 £136K. Programme grant for the statistical analysis of complex social data.
- 1983-1985 £18K. Project grant (joint with John Hinde) for computing of statistical models in geography.
- 1984-1986 £36K. Project grant (joint with Universite Paul Sabatier, Toulouse III) for comparative analyses of social data using British and French approaches.
- 1985-1987 £150K. Project grant (joint with Department of Sociology) for user-friendly software for event history analysis, and for advice on survey design and data analysis in the Social Change and Economic Life Initiative (SCELI).

Statistical Office of the European Economic Community

- 1981-1984 £83K Contract for the statistical modelling of very large scale survey data.

UK Computer Board

- 1985 £120K. Equipment grant (joint with Mathematics Department) for workstations for teaching statistical computing.

Israel Foundation (the Ford Foundation in Israel)

- 1990-1991 US$43K. Grant (joint with Ruth Zuzovsky) from the Israel Foundation ($20K) and the Israel Ministry of Education ($23K) for an indicator system for monitoring science education in elementary schools.

Australian Research Council

- 1992-1996 A$400K. Senior Research Fellowship for the development of a general likelihood theory of statistical inference.

- 2005-2008 A$247K. Discovery grant for Theory and applications of Bayesian and likelihood analyses for finite mixture, random effect and multinomial models.

- 2012-2015 A$280K. Discovery grant for latent class models in social networks and criminal careers (with Pip Pattison, Department of Psychology and Brian Francis, University of Lancaster).

US Office of Education

- 2002-2003 US$113K. Research sub-contract (with main contractor American Institutes for Research) for the investigation of methods for standard errors in regression models with incomplete data, and for the development of full-information methods for complex models.

- 2003-2009 (annual contracts with Irit Aitkin) US$1.5M Research subcontracts (with main contractor American Institutes for Research) for the investigation of efficient model-based computing methods for the National Assessment of Educational Progress (NAEP).

- 2011-13 US $400K Research grant (with Irit Aitkin, from Institute of Education Sciences) for Bayesian methods for model comparison and full information from incomplete covariates in multilevel models for NAEP data.

Current research

My current work in statistical theory is in two areas:

- the continued development and extension of nonparametric Bayesian methods through the universal multinomial model and noninformative Dirichlet prior. The Bayesian bootstrap of Rubin is the basis of this development, generalised to stratification and clustering in my 2008 paper in the Journal of Official Statistics.

- the extension of the value of large-scale Gaussian or GLM maximum likelihood analyses to fully Bayesian versions by direct use of the MLEs and SEs, without the need for MCMC and burn-in.

Both of these areas are developed at length in the 2023 CRC/Chapman and Hall Introductory book. This integrates the frequentist maximum likelihood and Bayesian approaches in a single first course. The book is designed as a first course for both Data Science and Statistics students.

I am now working with colleage Ross Darnell on a review of model-based analyses alternative to some machine learning procedures, including boostrapping and bagging.

Publications – Books

1. Aitkin, M. and Bennett, S.N. (1980) *A Theoretical and Practical Investigation into the Analysis of Change in Classroom Based Research*. UK Social Science Research Council, London.

2. Aitkin, M., Anderson, D.A., Francis, B.J. and Hinde, J.P. (1989) *Statistical Modelling in GLIM*. Clarendon Press, Oxford.

3. Aitkin, M., Francis, B.J. and Hinde, J.P. (2005) *Statistical Modelling in GLIM4*. Clarendon Press, Oxford.

4. Aitkin, M., Francis, B. Hinde, J. and Darnell, R. (2009) *Statistical Modelling in R*. Clarendon Press, Oxford.

5. Aitkin, M. (2010) *Statistical Inference: an Integrated Bayesian/Likelihood Approach*. Chapman and Hall/CRC, Boca Raton.

6. Aitkin, M. and Aitkin I. (2011) *Statistical Modeling of the National Assessment of Educational Progress*. Springer, New York.

7. Aitkin, M. (2023) *Introduction to Statistical Modelling and Inference*. Chapman and Hall/CRC, Boca Raton.

Publications – book chapters

1. Aitkin, M. (1971) Statistical theory (behavioral science application). *Annual Review of Psychology* **22**, 225-250.

2. Aitkin, M. (1972) The ranking of candidates at an examination. in *Mathematics in the Social Sciences in Australia*, Australian Government Publishing Service, Canberra, 541-547.

3. Aitkin, M. (1976) The teaching of statistics for the social sciences. in *Mathematics Needed for Particular Social Sciences*, ed. J. P. Sutcliffe. Academy of the Social Sciences in Australia, Canberra, 20pp.

4. Aitkin, M. and Healey, A.R. (1987) Statistical modelling of the EEC Labour Force survey: a project history. in *The Statistical Consultant in Action*, eds. Hand, D.J. and Everitt, B.S. University Press, Cambridge, 171-179.

5. Aitkin, M. (1989) Profile predictive likelihood for random effects in the balanced one-way classification. in *Multilevel Analysis of Educational Data*, ed. Bock, R.D. Academic Press, San Diego, 283-296.

6. Aitkin, M. and Stasinopoulos, M. (1989) Likelihood analysis of a binomial sample size problem. in *Contributions to Probability and Statistics: Essays in Honor of Ingram Olkin*, eds. Gleser, L.J., Perlman, M.D., Press, S.J. and Sampson, A.R. Springer-Verlag, New York, 399-411.

7. Zuzovsky, R. and Aitkin, M. (1991) Curricular change and science achievement in Israeli elementary schools. in *Pupils, Classrooms and Schools: International Studies of Schooling from a Multilevel Perspective*, eds. Willms, D. and Raudenbush, S. Academic Press, San Diego, 25-36.

8. Aitkin, M. (1998) Profile likelihood. in *Encyclopedia of Biostatistics*. John Wiley, New York, pp. 3534-3536.

9. Aitkin, M. and Aitkin, I. (2005) Bayesian inference for factor scores. in *Contemporary Psychometrics. A Festschrift to Roderick P. McDonald*, eds. Maydeu-Olivares, A. and McArdle, J.J. Lawrence Erlbaum Associates, Mahwah, NJ, pp. 207-222.

10. Aitkin, M. (2011) How many components in a finite mixture? in *Mixture Estimation and Applications*, eds. Mengersen, K.L., Robert, C.P. and Titterington, D.M. New York, Wiley, pp. 277-292.

11. Aitkin, M. (2016) Expectation Maximization algorithm and extensions. In *Handbook of Item Response Theory*, Volume 2 ed. van der Linden, W. Boca Raton, CRC Press, pp. 217-236.

Publications – Papers

1. Aitkin, M. (1964) Correlation in a singly truncated bivariate normal distribution. *Psychometrika* **29**, 263-270.

2. Aitkin, M. and Hume, M.W. (1965) Correlation in a singly truncated bivariate normal distribution II. Rank correlation. *Biometrika* **52**, 639-643.

3. Aitkin, M. and Hume, M.W. (1966) Correlation in a singly truncated bivariate normal distribution III. Correlation between ranks and variate values. *Biometrika* **53**, 278-281.

4. Aitkin, M. (1966) The correlation between variate-values and ranks in a doubly truncated normal distribution. *Biometrika* **53**, 281-282.

5. Aitkin, M., Nelson W.C. and Reinfurt, K.H. (1968) Tests for correlation matrices. *Biometrika* **55**, 327-334.

6. Aitkin, M. and Hume, M.W. (1968) Correlation in a singly truncated bivariate normal distribution IV. Empirical variances of rank correlation coefficients. *Biometrika* **55**, 437-438.

7. Aitkin, M. (1969) Some tests for correlation matrices. *Biometrika* **56**, 443-446. (1971) Correction. *Biometrika* **58**, 245.

8. Aitkin, M. (1969) Multiple comparisons in psychological experiments. *British Journal of Mathematical and Statistical Psychology* **22**, 193-198.

9. Aitkin, M. (1973) Fixed-width confidence intervals in linear regression with applications to the Johnson-Neyman technique. *British Journal of Mathematical and Statistical Psychology* **26**, 261-269.

10. Aitkin, M. (1974) Simultaneous inference and the choice of variable subsets in multiple regression. *Technometrics* **16**, 221-227.

11. Viney, L., Aitkin, M. and Floyd. J. (1974) Self-regard and size of human figure drawings: an interactional analysis. *Journal of Clinical Psychology* **30**, 581-586 (1974).

12. Singh, S., Westwood, N.H. and Aitkin, M., (1977) Structural analysis of the ridge count data of Australian Europeans using multivariate analysis. *Acta Geneticae Medicae et Gemellologiae (Roma)* **26**, 167-171.

13. Aitkin, M. (1978) The analysis of unbalanced cross-classifications (with Discussion). *Journal of the Royal Statistical Society A* **141**, 195-223.

14. Whittaker, J.C. and Aitkin, M. (1978) A flexible strategy for fitting complex log-linear models. *Biometrics* **34**, 487-495.

15. Aitkin, M. (1979) A simultaneous test procedure for contingency table models. *Applied Statistics* **28**, 233-242.

16. Aitkin, M. (1980) A note on the selection of log-linear models. *Biometrics* **36**, 173-178.

17. Aitkin, M. and Clayton, D. (1980) The fitting of exponential, Weibull and extreme value distributions to complex censored survival data using GLIM. *Applied Statistics* **29**, 156-163.

18. Aitkin, M. and Tunnicliffe Wilson, G. (1980) Mixture models, outliers and the E-M algorithm. *Technometrics* **22**, 325-331.

19. Aitkin, M. (1981) A note on the regression analysis of censored data. *Technometrics* **23**, 161-163.

20. Aitkin, M., Bennett, N. and Hesketh, J. (1981) Teaching styles and pupil progress: a reanalysis. *British Journal of Educational Psychology* **51**, 170-186.

21. Aitkin, M., Anderson, D.A. and Hinde, J.P. (1981) Statistical modelling of data on teaching styles (with Discussion). *Journal of the Royal Statistical Society A* **144**, 419-461.

22. Bock, R.D. and Aitkin, M. (1981) Marginal maximum likelihood estimation of item parameters: an application of an EM algorithm. *Psychometrika* **46**, 443-459.

23. Aitkin, M. (1981) Regression models for repeated measurements. *Biometrics* **37**, 831-832.

24. Aitkin, M. and Francis, B.J. (1982) Interactive regression modelling. *Biometrics* **38**, 511-513.

25. Aitkin, M. and Flowerdew, R. (1982) A method of fitting the gravity model based on the Poisson distribution. *Journal of Regional Science* **22**, 191-202.

26. Aitkin, M., Laird, N.M. and Francis, B.J. (1983) A reanalysis of the Stanford Heart Transplant data (with discussion). *Journal of the American Statistical Association* **77**, 264-292.

27. Aitkin, M. (1983) Comment on S.J. Prais. [Formal and informal teaching: a further re-consideration of Professor Bennett's statistics.] *Journal of the Royal Statistical Society A* **146**, 170-171.

28. Aitkin, M. and Healey, A.R. (1984) Mathematical modelling of the EEC Labour Force Survey. in *Recent Developments in the Analysis of Large-Scale Data Sets*. Office for Official Publications of the European Communities, Luxembourg, 23-50.

29. Aitkin, M. (1985) Comment on D. J. Bartholomew. [Foundations of factor analysis: some practical implications.] *British Journal of Mathematical and Statistical Psychology* **38**, 127-128.

30. Aitkin, M. and Healey, A.R. (1985) Statistical modelling of unemployment rates from the EEC Labour Force Survey. *Journal of the Royal Statistical Society A* **148**, 45-56.

31. Aitkin, M. and Rubin, D.B. (1985) Estimation and hypothesis testing in finite mixture models. *Journal of the Royal Statistical Society B* **47**, 67-75.

32. Anderson, D.A. and Aitkin, M. (1985) Variance component models with binary response: interviewer variability. *Journal of the Royal Statistical Society B* **47**, 203-210.

33. Aitkin, M. and Longford, N. (1985) Measuring effectiveness: a view by statisticians. *Link* 6 (2), 7-8. University of Lancaster Centre for Educational Research and Development (CERD).

34. Aitkin, M. and Longford, N.T. (1986) Statistical modelling issues in school effectiveness studies (with Discussion). *Journal of the Royal Statistical Society A* **149**, 1-43.

35. Aitkin, M. (1986) Statistical modelling: the likelihood approach. *The Statistician* **35**, 103-113.

36. Hinde, J.P. and Aitkin, M. (1986) Canonical likelihoods: a new likelihood treatment of nuisance parameters. *Biometrika* **74**, 45-58.

37. Aitkin, M. (1987) Modelling variance heterogeneity in normal regression using GLIM. *Applied Statistics* **36**, 332-339.

38. Aitkin, M., Francis, B. and Raynal N. (1987) Une étude comparative d'analyses des correspondances ou de classifications et des modeles de variables latentes ou de classes latentes. *Revue de Statistique Appliquée* **35**, 53-82.

39. Zuzovsky, R. and Aitkin, M. (1990) Using a multi-level model and an indicator system in science education to assess the effect of school treatment on student achievement. *School Effectiveness and School Improvement* **1**, 121-138.

40. Aitkin, M. (1991) Posterior Bayes factors (with Discussion). *Journal of the Royal Statistical Society B* **53**, 111-142.

41. Aitkin, M. (1992) Model choice in contingency table analysis using the posterior Bayes factor. *Computational Statistics and Data Analysis* **13**, 245-251.

42. Aitkin, M. and Francis, B. (1992) Fitting the multinomial logit model with continuous covariates in GLIM. *Computational Statistics and Data Analysis* **14**, 89-97.

43. Aitkin, M. (1992) Evidence and the posterior Bayes factor. *The Mathematical Scientist* **17**, 15-25.

44. Aitkin, M. (1993) Posterior Bayes factor analysis for an exponential regression model. *Statistics and Computing* **3**, 17-22.

45. Aitkin, M. and Fuchs, C. (1993) An analysis of models for the dilution and adulteration of fruit juice. *Statistics and Computing* **3**, 89-99.

46. Aitkin, M. and Zuzovsky, R. (1994) Multilevel interaction models and their use in the analysis of large-scale school effectiveness studies. *School Effectiveness and School Improvement* **5**, 45-73.

47. Zuzovsky, R. and Aitkin, M. (1994) A coupled process of conceptualizing a model of school effectiveness and developing an indicator system for monitoring effectiveness. *Tijdschrift voor Onderwijs Research* **19**, 65-81.

48. Aitkin, M. and Zuzovsky, R. (1994) A response to Raudenbush's comments. *School Effectiveness and School Improvement* **5**, 199-201.

49. Aitkin, M. and Aitkin, I. (1994) Review of SuperANOVA. *Applied Statistics* **43**, 422-427.

50. Aitkin, M. (1995) Comment on J.A. Nelder. [The statistics of linear models: back to basics.] *Statistics and Computing* **5**, 85-86.

51. Aitkin, M. (1995) Probability model choice in single samples from exponential families using Poisson log-linear modelling, and model comparison using Bayes and posterior Bayes factors. *Statistics and Computing* **5**, 113-120.

52. Aitkin, M. and Francis, B. (1995) Fitting overdispersed generalized linear models by nonparametric maximum likelihood. *The GLIM Newsletter* **25**, 37-45.

53. Aitkin, M., Finch, S., Mendell, N. and Thode, H. (1996) A new test for the presence of a normal mixture distribution based on the posterior Bayes factor. *Statistics and Computing* **6**, 121-125.

54. Aitkin, M. and Aitkin, I. (1996) A hybrid EM/Gauss-Newton algorithm for maximum likelihood in mixture distributions. *Statistics and Computing* **6**, 127-130.

55. Aitkin, M. (1996) A general maximum likelihood analysis of overdispersion in generalized linear models. *Statistics and Computing* **6**, 251-262.

56. Aitkin, M. (1996) A short history of a Vietnam War attitude survey. *Stats* **17**, 1-9.

57. Aitkin, M. (1996) Comment on I.S. Helland. [Simple counterexamples against the conditionality principle.] *The American Statistician* **50**, 384-385.

58. Aitkin, M. (1997) The calibration of P-values, posterior Bayes factors and the AIC from the posterior distribution of the likelihood (with Discussion). *Statistics and Computing* **7**, 253-272.

59. Aitkin, M. (1998) Simpson's paradox and the Bayes factor. *Journal of the Royal Statistical Society B* **60**, 269-270.

60. Aitkin, M. and Alfo', M. (1998) Regression models for binary longitudinal responses. *Statistics and Computing* **8**, 289-307.

61. Aitkin, M. (1999) A general maximum likelihood analysis of variance components in generalized linear models. *Biometrics* **55**, 117-128.

62. O'Sullivan, J.J., Derrick, G., Griggs, P., Foxall, R., Aitkin, M. and Wren, C. (1999) Ambulatory blood pressure in children. *Archives of Disease in Childhood* **80**, 529-532.

63. Aitkin, M. (1999) Meta-analysis by random-effect modelling in generalized linear models. *Statistics in Medicine* **18**, 2343-2351.

64. Parker, L., Pearce, M.S., Dickinson, H.O., Aitkin, M. and Craft, A.W. (1999) Stillbirths among the offspring of male radiation workers at the Sellafield nuclear reprocessing plant. *The Lancet* **354**, 1407-1414.

65. Welfare, M.R., Aitkin, M., Bassendine, M.F. and Daly, A.K. (1999) Detailed modelling of caffeine metabolism and examination of the *CYP1A2* gene: lack of a polymorphism in *CYP1A2* in Caucasians. *Pharmacogenetics* **9**, 367-375.

66. Charlton M.E., Brunsdon C., Aitkin M. and Fotheringham A.S. (1999) A comparison of random coefficient modelling and geographically weighted regression for spatially non-stationary regression problems. *Geographical and Environmental Modelling* **3** 47-62.

67. Zuzovsky, R. and Aitkin, M. (2000) Multilevel longitudinal analysis of IEA studies on science achievement using SISS and TIMSS data. *International Journal of Educational Policy, Research and Practice* **1**, 243-259.

68. Alfo', M. and Aitkin, M. (2000) Random coefficient models for binary longitudinal responses with attrition. *Statistics and Computing* **10**, 275-283.

69. Aitkin, M. (2001) Likelihood and Bayesian analysis of mixtures. *Statistical Modelling* **1**, 287-304.

70. Aitkin, M. and Rocci, R. (2002) A general maximum likelihood analysis of measurement error in generalized linear models. *Statistics and Computing* **12**, 163-174.

71. Pearce, M.S., Dickinson, H.O., Aitkin, M. and Parker, L. (2002) Stillbirths among the offspring of male radiation workers at the Sellafield nuclear reprocessing plant: detailed results and statistical aspects. *Journal of the Royal Statistical Society A* **165**, 523-548.

72. Shaw, I., Newton, D.P., Aitkin, M. and Darnell, R. (2003) Do OFSTED inspections of secondary schools make a difference to GCSE results? *British Educational Research Journal* **29**, 63-75.

73. Aitkin, M. and Foxall, R. (2003) Statistical modelling of artificial neural networks using the multi-layer perceptron. *Statistics and Computing* **13**, 227-239.

74. Aitkin, M. and Alfo', M. (2003) Longitudinal analysis of repeated binary data using autoregressive and random effect modelling. *Statistical Modelling* **3**, 291-303.

75. Aitkin, M., Boys, R.J. and Chadwick, T. (2005) Bayesian point null hypothesis testing via the posterior likelihood ratio. *Statistics and Computing*, **15**, 217-230.

76. Alfo', M. and Aitkin, M. (2006) Variance component models for longitudinal count data with baseline information: epilepsy data revisited. *Statistics and Computing* **16**, 231-238.

77. Aitkin, M. (2008) Bayesian bootstrap analysis of regression in finite population survey data with stratification and clustering. *Journal of Official Statistics* **24**, 21-51.

78. Liu, C.C. and Aitkin, M. (2008) Bayes factors: prior sensitivity and model generalizability. *Journal of Mathematical Psychology* **52**, 362-375.

79. Aitkin, M., Liu, C.C. and Chadwick, T. (2009) Bayesian model comparison and model averaging for small-area estimation. *Annals of Applied Statistics* **3**, 199-221.

80. Aitkin, M. (2013) Comments on the review of *Statistical Inference. Statistics and Risk Modeling* **30**, 121-132.

81. Aitkin, M., Vu, D. and Francis, B. (2014) Statistical modelling of the group structure of social networks. *Social Networks* **38**, 74-87.

82. Aitkin, M., Vu, D. and Francis, B. (2015) A new Bayesian approach for determining the number of components in a finite mixture. *Metron* **73**, 155-176.

83. Vu, D. and Aitkin, M. (2015) Variational algorithms for biclustering models. *Computational Statistics and Data Analysis* **89**, 12-24.

84. Aitkin, M., Vu, D. and Francis, B. (2017) Statistical modelling of a terrorist network. *J. Roy. Statist. Soc. A* **180**, 751-768.

85. Aitkin, M. (2018) A history of the GLIM statistical package. *International Statistical Review* **86**, 275-299.

86. Aitkin, M. and Liu, C.C. (2018) Confidence, credibility and prediction (with discussion by Little and Welsh and response). *Metron* **76**, 251-268.

87. Aitkin, M. (2018). Likelihood, credible and confidence intervals for parameters in complex models. *Metron* **76**, 305-320.

Teaching

Undergraduate – statistics major courses

Introduction to probability and statistics, statistical theory, linear models, generalized linear models, generalized linear mixed models, multivariate analysis, foundations of inference, linear programming.

Undergraduate – service courses

Statistics in the modern world, introduction to statistics for sociologists, introduction to probability and statistics for scientists and social scientists, psychological test theory.

Graduate courses

Stochastic processes, psychological test theory, generalized linear mixed models, variance component models, missing data, advanced inference.

Extra-mural short courses

Linear models, generalized linear models, survival analysis, variance component models, statistical computing in GLIM, modern Bayesian analysis, Bayesian model comparisons.

Dissertation and thesis supervision

- Merril Wayne Hume, PhD Virginia Polytechnic Institute 1964-67
- William Coyt Nelson PhD Virginia Polytechnic Institute 1964-67
- Karen Hillix Reinfurt MA University of North Carolina 1966-67
- Nancy Stooksberry Cole PhD University of North Carolina (part-supervision) 1966-67
- Ronald James McKay PhD University of New South Wales 1967-70
- Nathalie Raynal PhD University of Toulouse (part-supervision) 1983-5
- Andrew James Scott PhD University of Lancaster 1985-7
- Israel Parmet MSc Tel Aviv University 1989-91

- Tzippora Shochet MSc Tel Aviv University 1989-1991
- Yael Vila PhD Tel Aviv University 1992-1998
- Therese Shaw MSc University of Western Australia 1993-5
- Marco Alfo' PhD University of Chieta (part-supervision) 1997-9
- Robert John Foxall PhD University of Newcastle 1997-2001
- Iain Shaw DEd University of Newcastle (part-supervision) 1998-2000
- Thomas Chadwick PhD University of Newcastle 1998-2002
- Ross Darnell PhD University of Newcastle 1998-2003
- Magreth Njau MPhil University of Newcastle 2002-2004
- Dona Nayomi Sandarekha Attanayake PhD University of Melbourne; Chair of Advisory committee

Postdoctoral supervision

- Dr Roberto Rocci, 1998 – measurement error in generalized linear models
- Dr Tom Chadwick 2002/3 – standard errors with missing data
- Dr Charles Liu 2007/8 – Bayesian methods for model comparison

Conference Papers (pre-2000)

(1980) Mixture applications of the EM algorithm in GLIM. in *COMPSTAT 1980*, 537-541.

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Most influential publications

Books 2,3,4 – Statistical Modelling in GLIM/GLIM4/R

The first edition was favourably reviewed in many journals and was widely used as a text and reference book for courses in statistical modelling, generalized linear models and GLIM. The expanded second edition using GLIM4 appeared March 2005. A transcription to the R package appeared in 2009.
5. The 2010 book is a full exposition of the new approach to Bayesian model comparisons using posterior likelihoods.
6. The 2011 book with Irit Aitkin is an exposition of the integrated multilevel psychometric and statistical model approach to the analysis of the large-scale US educational surveys from NAEP – the National Assessment of Educational Progress.

Papers

17. This paper gave the Poisson representation for the kernel of the likelihood in samples from the Weibull and extreme value distributions; we also gave a unified computational method for fitting these distributions in GLIM. This approach to these models is now part of the standard theory of generalized linear models (see eg McCullagh and Nelder **Generalized Linear Models**, Chapter 9).
21. This paper broke new ground in educational statistics by advocating both variance component and latent class models for large-scale clustered educational research designs, and gave practical EM algorithms for fitting them.
22. This paper gave the first computationally feasible (EM) algorithm for fitting the binary logistic factor model to large scale psychometric test item data. It is widely quoted in the psychometric literature and has led to a number of extensions to more complex models.
41. This paper presented a new, though unsuccessful, alternative to Bayes factors for comparing statistical models. Papers 42, 44, 45, 46, 52 and 54 are applications of the approach to difficult modelling problems. Paper 60 refuted a counter example to the approach.
62. This paper gave a computationally straightforward method for nonparametric maximum likelihood estimation in generalized linear models with random effects, implemented in GLIM4 macros. It allowed the routine maximum likelihood analysis of two-level generalized linear mixed models without random effect distributional assumptions. Papers 64, 67, 69, 71, 75 and 78 are applications or extensions of this method.

74. This paper gave a reformulation of the feed-forward neural network (the multi-layer perceptron) as an explicit latent variable model, and gave EM and Fisher scoring algorithms for its maximum likelihood estimation without needing regularisation. This resolved the difficulties of back-propagation due to the mis-formulation of the objective function.
77. This paper extended to general model comparisons problems a fully Bayesian approach by Dempster to simple model comparisons.
80 gave extensions to non-nested model comparisons, with an example from psychology of a five-model comparison for memory retention, which refuted the preference ordering of these models through Bayes factors.
81 applied this approach to small-area estimation with a choice of upper-level models.
84 showed that the method worked well in detecting mixture structure.
83 extended the exponential random graph model, widely used in social network analysis, to latent class mixtures of these models, and showed that this approach recovered the sociological assessment of social groups in the Nachez women's group, a famous network data set.
86 applied this approach to a terrorist network.
85 extended the latent class model to clustering on both dimensions of a two-way array, and examined variational methods for large arrays.