

The Open University
Statistics Department
2001 Report

1. Membership

Professor P.H. Garthwaite (Head of Department)
Ms L.J. Champion (from May)
Professor F. Critchley
Dr A.E. Faria (from October)
Dr C.P. Farrington
Professor J.C. Gower
Dr D.A. Henderson (from September)
Dr G.E. Iossif
Professor M.C. Jones
Dr M.N. Kanaan (to August)
Dr P.V. Larsen
Dr K.J. McConway
Dr C.M. Queen
Dr S.K. Vines
Ms H.J. Whitaker (from November)
Mrs J.E. Williams

Long-term visitor

Dr P.C. Taylor (University of Hertfordshire)

Short-term visitor

Dr G. Coutin-Marie (Havana University)

Full-time research students

Mr B. Wright (from October)
Mrs L. Sun (from October)
Mr B.E.T.H. Twala
Mrs J. Warwick (to September)

Part-time research students

Mr G. Blunt
Ms J. Burrett
Mr A. Garrett
Dr M. King

Mr M. Lunt
Mr A. Pewsey

Support staff

Ms E. Ostrowski, Departmental Secretary

2. Introduction

The Department's renewal and refreshment was completed successfully in 2001 resulting in a sizeable, healthy and vibrant Statistics group. Daniel Henderson and Álvaro Faria joined us as lecturers, Álvaro having prime responsibility for our Statistical Advisory Service for researchers in the University. Lucy Champion joined us as Staff Tutor in the Bristol region. Heather Whitaker took over from Mona Kanaan as post-doctoral researcher working with Paddy Farrington.

Paddy Farrington and Jane Williams were promoted to Senior Lectureships. Congratulations to them.

In research, during 2001, Department members published 10 papers in refereed journals and 6 other publications. This contributes to a total of 114 papers in refereed journals and 62 other publications in the period 1996-2001. The Department was, however, very disappointed to receive a Grade 4 rating in the 2001 Research Assessment Exercise.

Our teaching continued to flourish. Major course writing efforts included continuing work on replacing our second level courses and on a new course in quantitative methods for business.

In May, Frank Critchley, Paul Garthwaite and Chris Jones gave an afternoon of professorial inaugural lectures! See Section 7 for titles.

Further information on the Department is available through our web pages at <http://mcs.open.ac.uk/statistics>.

3. Teaching

Presentation

The Department presented four courses (30 CATS points each): [MDST242](#) *Statistics in Society*, [M246](#) *Elements of Statistics*, [M343](#) *Applications of Probability* and [M346](#) *Linear Statistical Modelling*. Altogether the Department's courses attracted a total of more than 2,200 students.

Each of the Faculty of Mathematics and Computing's first level courses, [MU120](#) *Open Mathematics* and [MST121](#) *Using Mathematics*,

contains substantial amounts of statistical material (roughly one quarter of each) with which Gillian Iossif and Karen Vines were involved.

Kevin McConway contributed to the presentation of [U205](#) *Health and Disease*.

MST121, M246 and M346 were also presented to students of the Singapore Institute of Management.

Production

The Department continued work on preparing a revitalised statistical offering at second level, with particular attention given to the preparation of [M248](#) *Analysing Data* which will replace M246 in 2003. Gillian Iossif is Course Team Chair.

Three TV programmes associated with M248 were made and will be first broadcast on BBC2 in the spring of 2002. The three form a short series called '*Vital Statistics*' and have titles *Something in the Air?* (on epidemiology), *Hitting Targets* (on performance indicators) and *Risk*.

Work also continued on the preparation of a new course [BM240](#) *Quantitative Methods in Business*. This course is 'owned' by the Mathematics & Computing Faculty, within which the Statistics Department is situated, but forms an important contribution to the Open University's new undergraduate degree in Business Studies. It too is due to start in 2003 and Chris Jones is Course Team Chair.

Kevin McConway contributed to the production of [B300](#) *Business Behaviour in a Changing World*. Paddy Farrington contributed to the production of [S320](#) *Infectious Disease*. Frank Critchley contributed to an audio recording 'Uses of Matrices in Statistics' for MST121.

Other

The undergraduate [Diploma in Statistics](#) is awarded to students who successfully study M246, M343 and M346 (or their predecessors) plus one other course from a list of electives. The latest available figures are that 66 students were awarded the Diploma in 2000/01.

4. PhDs awarded

A PhD was awarded to Jane Warwick for her thesis *Selecting Tuning Parameters in Minimum Distance Estimators* (supervisor: M.C. Jones).

A PhD was also awarded to Fiona Harris (Open University Business School) for her thesis *Internal Factors Affecting Brand Performance* (joint supervisor: K.J. McConway).

5. Research interests

The Department is home to three Research Groups: *Multivariate Statistics* (Critchley (chair), Faria, Garthwaite, Gower, Jones, Larsen, Queen, Taylor, Twala, Vines, Constantine (CSIRO, retired), Cook (University of Minnesota), Marriott (National University of Singapore)), *Bayesian Statistics* (Queen (chair), Faria, Farrington, Garthwaite, Henderson, McConway, Vines) and *Medical Statistics* (Vines (chair), Farrington, Garthwaite, Kanaan, Whitaker). Research also continues, of course, on topics not covered by these Research Groups. Members of the Department are involved in a variety of research projects, including:

- *Influence analysis* (Critchley)
- *Regression graphics* (Critchley, Cook (University of Minnesota))
- *Multivariate analysis* (Critchley, Garthwaite, Gower, Larsen, Vines)
- *Differential geometry in statistics* (Critchley, Larsen, Marriott (National University of Singapore))
- *Environmental modelling* (Faria)
- *Bayesian statistics* (Faria, Garthwaite, Henderson, McConway, Queen, Vines)
- *Quantifying expert opinion* (Faria, Garthwaite, Queen)
- *Time series forecasting* (Faria, Queen)
- *Graphical models* (Faria, Queen)
- *Branching processes* (Farrington)
- *Goodness of fit of GLMs with sparse data* (Farrington)
- *Interval-censored survival data* (Farrington)
- *Capture-recapture methods* (Farrington, Garthwaite)
- *Statistics of infectious diseases (estimation of epidemic parameters and of vaccine efficacy; evaluation of vaccine safety; epidemic detection systems)* (Farrington, Kanaan, Whitaker)
- *Case crossover and case series studies* (Farrington, Vines)
- *Biased regression methods* (Garthwaite)

- *Monte Carlo confidence intervals* (Garthwaite)
- *Meta-analysis* (Garthwaite)
- *Clinical trials* (Garthwaite)
- *Multidimensional scaling* (Gower)
- *Biplots* (Gower)
- *Procrustes analysis* (Gower, Dijksterhuis (Royal Veterinary and Agricultural University, Copenhagen))
- *Bioinformatics* (Henderson)
- *Hidden Markov models* (Henderson)
- *Distribution theory* (Jones)
- *Local dependence* (Jones, Koch (University of Newcastle, Australia))
- *Skew t distributions* (Jones, Larsen, Faddy (University of Birmingham), Sahu (University of Southampton))
- *Miscellaneous smoothing topics* (Jones, Nielsen (Codan, Copenhagen), Park (Seoul National University), Yu (University of Plymouth))
- *Projects in archaeology* (Jones, Williams-Thorpe (Earth Sciences, OU))
- *Spatial statistics* (Kanaan, Taylor, Mugglestone (MRC Institute for Environmental Health, Leicester))
- *Asymptotic statistics* (Larsen)
- *Statistical methods in plant ecology and evolution* (McConway)
- *Statistical issues in brand management* (McConway, Harris (Management, OU))
- *Learning about concepts of randomness* (McConway, Johnston-Wilder (Mathematics Education, OU), Mason (Mathematics Education, OU), Pratt (University of Warwick))
- *Comparative methods using phylogenies* (McConway, Silvertown (Biological Sciences, OU))

- *Methods for comparing cladogenesis rates in phylogenies* (McConway, Sims (Smithsonian Institution, Washington DC))
- *Ecological and genetic correlates of long-term population trends in plants* (McConway, Silvertown (Biological Sciences, OU), Lupton (Rothamsted Experimental Station), Macnair (University of Exeter))
- *Dynamic models* (Queen)
- *Classification and regression trees* (Twala, Jones, Taylor)
- *Bayesian analysis of case-control studies* (Vines)
- *Principal components analysis* (Vines)
- *Minimum distance estimation* (Warwick, Jones)
- *Environmental epidemiology* (Whitaker)

6. Publications

6.1 Publications in refereed academic journals

Al-Awadhi, S.A. & Garthwaite, P.H. (2001) Prior distribution assessment for a multivariate normal distribution: an experimental study. *Journal of Applied Statistics*, 28, 5-23.

Critchley, F., Atkinson, R.A., Lu, G. & Biazi, E. (2001) Influence analysis based on the case sensitivity function. *Journal of the Royal Statistical Society, Series B*, 63, 307-23.

Farrington, C.P., Kanaan, M.N. & Gay, N.J. (2001) Estimation of the basic reproduction number for infectious diseases from age-stratified serological survey data (with discussion). *Applied Statistics*, 50, 251-83.

Farrington, C.P. & Miller, E. (2001) Vaccine trials. *Molecular Biotechnology*, 17, 43-58.

Farrington, C.P., Miller, E. & Taylor, B. (2001) MMR and autism: further evidence against a causal association. *Vaccine*, 19, 3632-5.

Garthwaite, P.H. & Al-Awadhi, S.A. (2001) Non-conjugate prior distribution assessment for multivariate normal sampling. *Journal of the Royal Statistical Society, Series B*, 63, 95-110.

Jones, M.C., Hjort, N.L. Harris, I.R. & Basu, A. (2001) A comparison of related density-based minimum divergence estimators. *Biometrika*, 88, 865-73.

Jones, M.C. & Williams-Thorpe, O. (2001) An illustration of the use of an atypicality index in provenancing British stone axes. *Archaeometry*, 43, 1-18.

Miller, E., Waight, P., Farrington, C.P., Stowe, J. & Taylor, B. (2001) Idiopathic thrombocytopenic purpura and MMR vaccine. *Archives of Disease in Childhood*, 84, 227-9.

Vines, S.K. & Farrington, C.P. (2001) Within-subject exposure dependency in case-crossover studies. *Statistics in Medicine*, 20, 3039-49.

6.2 Research monograph

Ramsay, C.R., Grant, A.M., Wallace, S.A., Garthwaite, P.H., Monk, A.F. & Russell, I.T. (2001) *Statistical Assessment of the Learning Curves of Health Technologies*. Health Technology Assessment, Volume 5, Number 12.

6.3 Edited book

McConway, K.J. & Davey, B. (eds) (2001) *Studying Health and Disease*, colour-enhanced second edition. Buckingham: Open University Press.

6.4 Refereed book chapters

Farrington, C.P. & Miller, E. (2001) Meningococcal vaccine trials. In *Meningococcal Vaccines*, eds A.J. Pollard & C.J. Maiden, Totowa, NJ: Humana Press, 371-93.

Gower, J.C. (2001) Procrustes analysis. In *International Encyclopedia of the Social and Behavioural Sciences*, eds N.J. Smelser & P.B. Baltes, Oxford: Elsevier, 18, 12141-3.

Jones, M.C. (2001) A skew t distribution. In *Probability and Statistical Models with Applications*, eds C.A. Charalambides, M.V. Koutras & N. Balakrishnan, London: Chapman & Hall/CRC, 269-78.

Williams-Thorpe, O., Jones, M.C., Peacock, D.P.S., Potts, P.J. & Rigby, I.J. (2001) Geology, mineralogy and characterization studies of Imperial Porphyry. In *Roman Imperial Quarries, Surveys and Excavation at Mons Porphyrites 1994-1998*, eds V.A. Maxfield & D.P.S. Peacock, London: Egypt Exploration Society, 305-18.

7. Talks at the Open University

The Department continued to run its active seminar programme with invited external speakers. During the year we heard:

Dr A.R. Duncombe (University of Kent) *Bayesian model choice for longitudinal data with non-random dropout*

Dr J.P. Hinde (University of Exeter) *Models for count data with many zeroes*

Dr J.L. Hutton (University of Warwick) *Models for survival data: choice between accelerated life and proportional hazard models*

Dr P.K. Marriott (National University of Singapore) *On the geometry of measurement error models*

Professor A.H. Welsh (University of Southampton) *Incomplete detection of enumeration surveys*

Professor D.J. Hand (Imperial College, London) *Multiple classifier systems based on interpretable linear classifiers*

Dr P.E. Jupp (University of St Andrews) *Some applications of directional statistics to astronomy*

Dr P. Besbeas (University of Kent) *Stochastic models for animal capture-recapture and census data*

Professor S. Richardson (Imperial College, London) *Modelling heterogeneity in biomedical research: some examples*

We also ran two internal research sessions during the year. Speakers were: Chris Jones, Bheki Twala, Pia Larsen, Paul Garthwaite, Paddy Farrington, Kevin McConway and John Gower.

The Department's unusual 'Inaugural Day' in May featured:

Chris Jones on *An exciting topic: academic statistics*

Paul Garthwaite on *Quantifying expert opinion* and

Frank Critchley on *A many splendoured thing*.

8. Conference papers presented

F. Critchley

International Conference on Robust Statistics, Vorau, Austria: *Saliency diagnostics: the influence curve re-visited* (invited).

C.P. Farrington

German Biometric Colloquium, Hamburg, Germany: *Estimation of epidemiological parameters for infectious diseases from serological survey data* (invited).

PHLS Conference on the Contribution of Statistics to Public Health, London: *Multiple capture methods in epidemiology: what are the counts for?* (invited).

Inaugural Meeting of the British Pharmacoepidemiology Society, London: *The self-controlled case series method in practice* (invited).

IMA Conference on Infectious Disease Modelling, Cardiff: *Estimation of the reproduction number from age-stratified serological survey data.*

IMA Conference on Infectious Disease Modelling, Cardiff: *Branching process models for surveillance after elimination.*

J.C. Gower

Tenth International Workshop on Matrices and Statistics, Voorburg, Netherlands: *Applications of the modified Leverrier-Faddeev algorithm* (invited).

International Meeting of the Psychometric Society, Osaka, Japan: *A unified approach to oblique Procrustes problems* (invited).

Biometrics Society Meeting to Celebrate Centenary of Biometrika, London: *Before Biometrika* (invited).

Third International Workshop on Multivariate and Data-Analysis, Salamanca, Spain: *Procrustes analysis* (invited).

P.C. Taylor

RSS2001 International Conference of the Royal Statistical Society, Glasgow: *Investigating associations between point processes and lattice processes using cross-spectral analysis.*

RSS2001 International Conference of the Royal Statistical Society, Glasgow: *Spectral analysis of spatial point patterns in complicated study regions.*

European School on Intelligent Data Analysis, Palermo, Italy: *Statistical methods for data analysis.*

9. Other seminars and talks given

F. Critchley

University of York: *Some aspects of differential geometry in statistics*

C.P. Farrington

RSS Read Paper presentation, London: *Estimation of the basic reproduction number for infectious diseases from age-stratified serological survey data.*

MRC Biostatistics Unit, Cambridge: *Vaccine safety evaluation: old pitfalls and new methods.*

MRC meeting on the long term effects of vaccination, London: *The self-controlled case series method for vaccine safety evaluation.*

University of Reading: *Estimation of epidemiological parameters for infectious diseases from serological survey data.*

University of Lancaster: *Estimation of epidemiological parameters for infectious diseases from serological survey data.*

P.H. Garthwaite

University of Southampton: *Quantifying expert opinion in the UK water industry: an experimental study.*

University of Reading: *Quantifying expert opinion in the UK water industry: an experimental study.*

University of Cambridge: *Prior distribution assessment for multivariate normal sampling.*

University of Kent: *Quantifying expert opinion as a probability distribution.*

J.C. Gower

National Centre for University Entrance Examinations, Tokyo, Japan: *The Open University.*

National Centre for University Entrance Examinations, Tokyo, Japan: *Some new types of biplot.*

Institute of Statistical Mathematics, Tokyo, Japan: *Applications of the modified Leverrier-Faddeev algorithm.*

Royal Veterinary and Agricultural University, Copenhagen, Denmark: *An overview of Procrustes analysis.*

M.C. Jones

London School of Economics: *The skew t distribution and its extended family*.

University of Manchester: *The skew t distribution and its extended family*.

Chinese University of Hong Kong: *The skew t distribution and its extended family*.

C.M. Queen

University of Southampton: *Modelling a traffic network*.

RSS East Midlands Local Group, Nottingham: *Modelling a traffic network*.

S.K. Vines

RSS General Applications Section, London: *Integer-based simple components*.

10. Editorships

F. Critchley

- Editorial Board member: *Journal de la Société Française de Statistique*
- Editorial Board member: *Studies in Classification, Data Analysis, and Knowledge Acquisition* (book series, Springer-Verlag)

C.P. Farrington

- Editorial board member: *Statistics in Medicine*
- Editorial board member: *Epidemiology and Infection*
- Editorial board member: *Lifetime Data Analysis*

P.H. Garthwaite

- Associate editor: *Journal of the Royal Statistical Society, Series B*

J.C. Gower

- Associate editor: *Psychometrika*
- Associate editor: *Journal of Classification*
- Consultant editor: *The Mathematical Scientist*

- Statistical editor: *Journal of Agricultural Science*

M.C. Jones

- Associate editor: *Communication in Statistics*
- Associate editor: *Journal of Nonparametric Statistics*

11. Grants awarded

F. Critchley

- US\$1900, second-level grant from U.S. National Science Foundation connected with R.D. Cook's grant 'Foundations of regression graphics'.
- ATS7000 from Vienna University of Technology to work with P. Filzmoser on 'The robustness/influence interface'.

M.C. Jones

- Joint holder, with Earth Sciences Department at OU, of grant for £21,159 from the Leverhulme Trust for 'Provenancing of Neolithic bluestone axes and implications for Stonehenge'.

C.M. Queen

- Expenses awarded by European Science Foundation to attend Highly Structured Stochastic Systems Workshop on Structural Stochastic Systems for Individual Behaviours, Louvain-la-Neuve, Belgium.

12. Other activities

F. Critchley

- is a selector, Civil Service Selection Board for fast stream statisticians.
- is external examiner for the undergraduate and masters statistics programme at the University of Aberdeen.
- examined a PhD for the Université Paul Sabatier, Toulouse.
- conducted joint research with P.K. Marriott at the National University of Singapore and R.D. Cook at the University of Minnesota.
- completed supervision of PhD student at University of Birmingham.

C.P. Farrington

- is a member of the WHO Global Advisory Committee for Vaccine Safety.
- is a member of the nvCJD Epidemiology subcommittee of SEAC (Spongiform Encephalopathy Advisory Committee).
- is an honorary scientist at the Communicable Disease Surveillance Centre, London.
- is an honorary member of the Faculty of Public Health Medicine and an honorary lecturer at the Department of Epidemiology and Population Sciences, London School of Hygiene and Tropical Medicine, lecturing on vaccine efficacy evaluation and analysis of sero-epidemiological data.

P.H. Garthwaite

- is external examiner for undergraduate statistics courses for the University of Durham.
- examined a PhD for the University of Southampton.

J.C. Gower

- is Honorary Secretary of the Sir Ronald Aylmer Fisher Memorial Committee of Great Britain.
- is a member of the Council of the International Federation of Classification Societies.
- is a Foreign Member of the Advisory Board of IOPS (Interuniversitaire Onderzoekschool voor Psychometrie en Sociometrie).
- examined PhDs, twice at the University of Leiden, Netherlands, and once for the University of the Witwatersrand, South Africa.

M.C. Jones

- was elected to membership of the International Statistical Institute.
- is external examiner for undergraduate statistics courses for Imperial College of Science and Technology, London
- is a member of the Institute of Mathematical Statistics Committee on Fellows.
- refereed 22 papers.

K.J. McConway

- wrote an article "Stand out from the crowd – show off your vital statistics" for *The Big Issue*.

C.M. Queen

- was invited discussant at the Highly Structured Stochastic Systems Workshop on Structural Stochastic Systems for Individual Behaviours, Louvain-la-Neuve, Belgium.
- was external examiner for a PhD at the University of Hertfordshire.

P.C. Taylor

- is a member of Statistical Computing Section Committee and Programme Committee of the Royal Statistical Society.

S.K. Vines

- is a member of the Eastern Multi-Centre Research Ethics Committee.
- is secretary of the General Applications Section Committee and a member of the Programme Committee of the Royal Statistical Society.

J.E. Williams

- continued in her role as Faculty of Mathematics and Computing Sub-Dean (Courses in Presentation).