

**The Open University**  
**Statistics Department**

**2000 Report**

**1. Membership**

Dr K.J. McConway (Head of Department)  
Professor F. Critchley  
Professor P.H. Garthwaite (from September)  
Professor J.C. Gower  
Professor M.C. Jones  
Ms P.M. Biss (March to May)  
Dr C.P. Farrington  
Dr G.E. Iossif  
Dr M.N. Kanaan  
Dr P.V. Larsen (from June)  
Dr A.D. Lunn  
Dr C.M. Queen (from August)  
Dr S.K. Vines  
Mrs J.E. Williams

*Visitors*

Professor R.D. Cook (University of Minnesota)  
Professor C.E. Lunneborg (University of Washington, Seattle)  
Dr P.C. Taylor (University of Hertfordshire)

*Full-time research students*

Mr Y. Abou-Salama (to March)  
Mr B.E.T.H. Twala  
Mrs J. Warwick

*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 proceeded successfully in 2000 resulting in a sizeable, healthy and vibrant Statistics group. In particular, Paul Garthwaite was appointed to the established Chair in Statistics and Pia Larsen, Catriona Queen and Karen Vines were appointed to Lectureships. In addition, Chris Jones was promoted to Professor of Statistical Science.

This appointment activity did not hinder Departmental productivity in terms of research or teaching. During 2000, Department members published 19 papers in refereed journals and 3 book chapters. We hold a Grade 4 rating from the 1996 Research Assessment Exercise, but personnel has changed significantly since then and the number of research-active staff has increased considerably.

In addition, our teaching continued to flourish. Major course writing efforts included continuing work on replacing our second level courses and the start of work on a new course in quantitative methods for business.

Karen Vines' appointment to a Lectureship has left the Department's Statistical Advisory service unavailable at the present time.

Information on the Department is available through our Web pages at <http://stats-www.open.ac.uk>.

## 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 almost 2,200 students.

MST121 and M246 were also presented to students of the Singapore Institute of Management. (M346 and M343 will also be presented to Singapore students in alternate years to come.)

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 is heavily involved.

Kevin McConway also contributed to the presentation of U205 *Health and Disease* and D300 *Professional Judgement and Decision Making*.

### *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.

A TV programme associated with M248, called *In Search of Certainty*, about the life and works of R.A. Fisher, was made and broadcast on BBC2.

Work also started 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.

#### *Other*

The new undergraduate *Diploma in Statistics* came to fruition in 1999. This qualification is awarded to students who successfully study M246, M343 and M346 (or their predecessors) plus one other course from a list of electives. A total of 47 students obtained this qualification in 1999 and preliminary figures suggest (at least) a further 55 in 2000.

#### **4. PhD's awarded**

A PhD was awarded to Mona Kanaan for her thesis *Cross-Spectral Analysis for Spatial Point-Lattice Processes* (supervisor: P.C. Taylor)

#### **5. Research interests**

The Department is home to two Research Groups: *Multivariate Statistics* (Critchley (chair), Abou-Salama, Garthwaite, Gower, Jones, Larsen, Lunn, Queen, Taylor, Twala, Vines, Constantine (CSIRO, retired), Cook (University of Minnesota), Marriott (National University of Singapore)) and *Medical Statistics* (Vines (chair), Farrington, Garthwaite, Kanaan, Lunn, Warwick, M. Lunn (University of Oxford)). A third Research Group, *Bayesian Statistics*, will be added at the start of 2001. 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, Gower, Larsen, Vines)
- *Differential geometry in statistics* (Critchley, Larsen, Marriott (National University of Singapore))
- *Branching processes* (Farrington)

- *Interval-censored survival data* (Farrington)
- *Capture-recapture methods* (Farrington, Garthwaite)
- *Goodness of fit of GLMs with sparse data* (Farrington)
- *Statistics of infectious diseases (estimation of epidemic parameters and of vaccine efficacy; evaluation of vaccine safety; epidemic detection systems)* (Farrington, Kanaan)
- *Case crossover and case series studies* (Farrington, Vines)
- *Biased regression methods* (Garthwaite)
- *Learning curves in health* (Garthwaite)
- *Quantifying expert opinion* (Garthwaite)
- *Monte Carlo confidence intervals* (Garthwaite)
- *Meta-analysis* (Garthwaite, Lunn)
- *Clinical trials* (Garthwaite, Lunn)
- *Bayesian statistics* (Garthwaite, Lunn, McConway, Queen, Vines)
- *Multidimensional scaling* (Gower)
- *Biplots* (Gower)
- *Procrustes analysis* (Gower, Dijksterhuis (Royal Veterinary and Agricultural University, Copenhagen))
- *Distribution theory* (Jones)
- *Skew  $t$  distributions* (Jones, Larsen, Faddy (University of Birmingham), Sahu (University of Southampton))
- *Local dependence* (Jones, Koch (University of Newcastle, Australia))
- *Miscellaneous smoothing topics* (Jones, Hjort (University of Oslo), Nielsen (Codan, Copenhagen), Park (Hankuk University of Foreign Studies), Signorini (Quadstone Ltd, Edinburgh), Wright (University of Plymouth), Yu (University of Plymouth))
- *Spatial statistics* (Kanaan, Taylor, Muggleston (MRC Institute for Environmental Health, Leicester))
- *Asymptotic statistics* (Larsen)
- *Statistical methods in plant ecology and evolution* (McConway)
- *Comparative methods using phylogenies* (McConway, Silvertown (Biological Sciences, OU))
- *The determinants of species richness in flowering plants* (McConway, Silvertown (Biological Sciences, OU), Sims (Biological Sciences, OU))
- *Methods for comparing cladogenesis rates in phylogenies* (McConway, Silvertown (Biological Sciences, OU), Dodd (Biological Sciences, OU), Sims (Biological Sciences, OU))
- *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)
- *Multivariate forecasting* (Queen)
- *Graphical 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, Basu (Indian Statistical Institute), Harris (University of Northern Arizona), Hjort (University of Oslo))

## 6. Publications

### 6.1 Publications in refereed academic journals

Andrews, N.J., Farrington, C.P., Cousens, S.N., Smith, P.G., Ward, H., Knight, R.S.G., Ironside, J.W. and Will, R.G. (2000) Incidence of variant Creutzfeldt-Jakob disease in the UK. *The Lancet*, 356, 481-2.

Andrews, N.J., Pebody, R.G., Berbers, G., Blondeau, C., Crovari, P., Davidkin, I., Farrington, C.P., Fievet-Groyne, F., Gabutti, G., Gerike, E., Giordano, C., Hesketh, L., Marzec, T., Morgan-Capner, P., Osborne, K., Pleisner, A.M., Raux, M., Tischer, A., Ruden, U., Valle, M. and Miller, E. (2000) The European Sero-Epidemiology Network: standardizing the enzyme immunoassay results for measles, mumps and rubella. *Epidemiology and Infection*, 125, 127-41.

Aucott, L.S., Garthwaite, P.G. and Curral, J. (2000) Regression methods for high-dimensional multicollinear data. *Communications in Statistics—Simulation and Computation*, 29, 1021-37.

Cook, R.D. and Critchley, F. (2000) Identifying regression outliers and mixtures graphically. *Journal of the American Statistical Association*, 95, 781-94.

De Serres, G., Gay, N.J. and Farrington, C.P. (2000) The epidemiology of transmissible diseases after elimination. *American Journal of Epidemiology*, 151, 1039-48.

Dourado, I., Cunha, S., Teixeira M de G., Farrington, C.P., Melo, A., Lucena, R. and Barreto, M.L. (2000) An outbreak of aseptic meningitis associated with a Urabe-containing MMR mass vaccination campaign: implications for immunization programs. *American Journal of Epidemiology*, 151, 524-30.

Farrington, C.P. (2000) Residuals for proportional hazards models with interval-censored survival data. *Biometrics*, 56, 473-82.

Garthwaite, P.H. and O'Hagan, A. (2000) Quantifying expert opinion in the UK water industry: an experimental study. *The Statistician*, 49, 455-77.

Gijbels, I., Hall, P., Jones, M.C. and Koch, I. (2000) Tests for monotonicity of a regression mean with guaranteed level. *Biometrika*, 87, 663-73.

Gower, J.C. (2000) Rank-one and rank-two departures from symmetry. *Computational Statistics and Data Analysis*, 33, 177-88.

Jones, M.C. (2000) Rough-and-ready assessment of the degree and importance of smoothing in functional estimation. *Statistica Neerlandica*, 54, 37-46.

Lloyd, C.J. and Jones, M.C. (2000) Nonparametric density estimation from biased data with unknown biasing function. *Journal of the American Statistical Association*, 95, 865-76.

Ramsey, C.R., Grant, A.M., Wallace, S.A., Garthwaite, P.H., Monk, A. and Russell, I.T. (2000) Assessment of the learning curve in health technologies: a systematic review. *International Journal of Technology Assessment in Health Care*, 16, 1095-1108.

Silvertown, J., McConway, K.J., Dodd, M.E. and Chase, M.W. (2000) 'Flexibility' as a trait and methodological issues in species diversity variation among angiosperm families. *Evolution*, 54, 1066-8.

Vines, S.K. (2000) Simple principal components. *Applied Statistics*, 49, 441-51.

Wang, D.Q. and Critchley, F. (2000) Multiple deletion measures and conditional influence in regression model. *Communications in Statistics-Theory and Methods*, 29, 2391-404.

Webster, G.J.M., Hallett, R., Whalley, S.A., Meltzer, M., Balogun, K., Brown, D., Sharma, S., Hamilton, G., Farrow, S.C., Ramsay, M.E., Teo, C.G., Farrington, C.P. and Dusheiko, G.M. (2000) The molecular epidemiology of a large outbreak of hepatitis B linked to 'autohaemotherapy'. *The Lancet*, 356, 379-84.

Whitlock, M.E. and Queen, C.M. (2000) Modelling a traffic network with missing data. *Journal of Forecasting*, 19, 561-74.

Williams-Thorpe, O., Jones, M.C., Webb, P.C. and Rigby, I.J. (2000) Magnetic susceptibility thickness corrections for small artefacts and comments on the effects of 'background' materials. *Archaeometry*, 42, 101-8.

## **6.2 Refereed conference contributions and book chapters**

Critchley, F. (2000) On a framework for dissimilarity analysis. In *Data Analysis: Scientific Modeling and Practical Application*, eds W.Gaul, O. Optiz and M. Schader, Springer, 121-34.

Critchley, F., Marriott, P.K. and Salmon, M.H. (2000) An elementary account of Amari's expected geometry. In *Applications of Differential Geometry to Econometrics*, eds P.K. Marriott and M.H. Salmon, Cambridge University Press, 294-315.

Jones, M.C. (2000) A skew t distribution. In *Probability and Statistical Methods with Applications: a Volume in Honor of Theophilos Cacoullos*, eds C.A. Charalambides, M.V. Koutras and N. Balakrishnan, Chapman and Hall/CRC, 269-78.

### **6.3 Letter to the editor of refereed journal**

Taylor, B., Miller, E. and Farrington, C.P. (2000) Autism and measles, mumps and rubella vaccine. *Lancet*, 355, 409.

## **7. Seminars and conferences at the Open University**

The annual Open University Statistics Conference, the 11<sup>th</sup> in the series, was this year held in conjunction with the 34<sup>th</sup> Midlands and Northern Universities Statistics Group conference. Speakers were:

Dr G.P. Nason (University of Bristol) *Wavelets in statistics: review and future*.

Professor T.J. Sweeting (University of Surrey) *Objective Bayes via coverage probability bias: current status and future challenges*.

Professor V.T. Farewell (University College, London) *Human factors and cardiac surgery: an initial study*.

Professor R.D. Cook (University of Minnesota, USA) *Dimension reduction and visualization in discriminant analysis*.

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

Professor D. Draper (University of Bath) *Performance indicators in UK higher education*.

Professor J.B. Copas (University of Warwick) *Sensitivity analysis for inference in meta-analysis*.

Mr D. Harrison & Ms. E. Couto (MRC Biostatistics Unit, Cambridge) *Case-control estimates of disease progression*.

Dr S.J. Pitts (University of Cambridge) *Nonparametric estimation from busy and idle periods in queues*.

Dr J.J. Forster (University of Southampton) *Bayesian estimation of small population frequencies.*

Dr R. Thomas (Social Sciences, Open University) *The problem of the denominator.*

Professor J.T. Kent (University of Leeds) *Growth models for shape data.*

Dr L.C. Wolstenholme (City University, London) *Testing the weakest-link property.*

Also, in September, we ran an internal Research afternoon at which the speakers were Gordon Blunt, Frank Critchley, Mona Kanaan, Karen Vines and Jane Warwick.

## **8. Conference papers presented**

### **F. Critchley**

International Conference to Honour C.R. Rao's 80<sup>th</sup> Birthday, Calcutta, India: *On influence in multivariate analysis.*

### **J.C. Gower**

International Conference on Measurement and Multivariate Analysis, Banff, Canada: **Categories and quantities** (Keynote address).

Conference of the International Federation of Classification Societies (ICFS 2000), Namur, Belgium: **The British Classification Society.**

Fifth International Conference on Social Science Methodology, Cologne, Germany: **Models for asymmetry.**

Fifth International Conference on Social Science Methodology, Cologne, Germany: **Correspondence analysis and multidimensional scaling.**

### **M.C. Jones**

Order Statistics and Extreme Values Conference, Mysore, India: *A general family of distributions on  $R$  with parameters controlling skewness and tailweight.*

### **K.J. McConway**

Association of Statistics Lecturers in Universities/ RSS Education Section Conference on Statistical Education at the Beginning of the Millenium: *What do statistics students really want? Students' feedback at the Open University.*



## **C.M. Queen**

Royal Statistical Society Conference (RSS2000), Reading: *Modelling a traffic network.*

## **B.E.T.H. Twala**

23<sup>rd</sup> Research Students' Conference in Probability and Statistics, Cardiff: *Learning incomplete examples using decision trees.*

## **S.K. Vines**

Royal Statistical Society Conference (RSS2000), Reading: *Multivariate statistics made simple.*

## **9. Other seminars and talks given**

### **F. Critchley**

Université de Toulouse (Paul Sabatier), France: *Some aspects of influence analysis.*

### **C.P. Farrington**

RSS Medical Section, London: *Safety of MMR vaccines.*

University of Southampton: *Residuals for interval-censored survival data.*

Université de Toulouse (Paul Sabatier), France: *Residus pour donnees de survie censurees par intervalles.*

Universite de Pau, France: *La methode des series de cas.*

### **M.C. Jones**

University of Oxford: The skew t distribution.

University of Southampton: The skew t distribution.

## **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: *Statistics and Computing*

## **11. Grants awarded**

### **F. Critchley**

- Differential geometry of influence analysis. S\$9770 from the National University of Singapore (with P.K. Marriott).

### **C.P. Farrington**

- Estimation of contact rates and threshold parameters for infectious diseases from serological survey data. £103,854 for a 2.75 year project from the Wellcome Trust.

### **M.C. Jones**

- Travel grant for trip to India. £887 from Royal Society.

## **12. Other activities**

### **F. Critchley**

- is external examiner for the undergraduate and masters statistics programme at the University of Aberdeen.
- examined a PhD for the École Nationale Supérieure des Télécommunications, Paris.
- was a member of the Awards Committee for the International Federation of Classification Societies 2000 Conference, Namur, Belgium.

### **C.P. Farrington**

- 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.
- acted as External Assessor for the London School of Hygiene and Tropical Medicine's MSc Postgraduate Diploma in Epidemiology: Principles and Practice.
- acted as Special Adviser to Centers for Disease Control, Atlanta.
- acted as Special Adviser for World Health Organisation in Cuba and Geneva (twice).
- taught on a short course on vaccine epidemiology in Rio de Janeiro.

### **P.H. Garthwaite**

- was appointed external examiner for undergraduate statistics courses for the University of Durham.
- examined an MSc and PhD for the University of Queensland and a PhD thesis for the University of Edinburgh.

### **J.C. Gower**

- is Honorary Secretary of the Sir Ronald Aylmer Fisher Memorial Committee of Great Britain.
- is a Foreign Member of the Advisory Board of IOPS (Interuniversitaire Onderzoekschool voor Psychometrie en Sociometrie).
- organised a session on *Analysis of square tables* at the Fifth International Conference on Social Science Methodology, Cologne.
- spent a month in Cologne working with J. Blasius and G. Dijksterhuis.

### **M.C. Jones**

- was appointed external examiner for undergraduate statistics courses for Imperial College of Science and Technology, London.
- examined PhD for the University of Warwick.
- spent some time early in 2000 finishing off outstanding jobs associated with his four year term as Joint Editor, *Journal of the Royal Statistical Society, Series B*.
- refereed 25 papers.
- spent a short time as Acting Faculty of Mathematics and Computing Sub-Dean (Research).

### **M.N. Kanaan**

- presented a poster (co-authored with C.P. Farrington) entitled *Estimation of vaccine efficacy with incomplete case ascertainment* at RSS 2000, Reading.

### **K.J. McConway**

- took part in a discussion on statistics on the Radio 4 *Today* programme.

### **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 Anglia and Oxford Multicentre Research Ethics Committee.
- is a member of the General Applications Section Committee and Programme Committee of the Royal Statistical Society.
- completed a three year stint as Departmental seminar organiser.

### **J.E. Williams**

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