

# The Open University Statistics Department 2003 Report

## 1. Membership

Professor P.H. Garthwaite (Head of Department)  
Ms L.J. Champion (to May)  
Professor F. Critchley  
Dr A.E. Faria  
Dr C.P. Farrington  
Professor J.C. Gower  
Dr D.A. Henderson  
Dr G.E. Iossif  
Professor M.C. Jones  
Mr I.W. Martin  
Dr K.J. McConway  
Dr C.M. Queen  
Mr B.E.T.H. Twala (to March)  
Dr S.K. Vines  
Dr H.J. Whitaker  
Mrs J.E. Williams

### ***Long-term visitor***

Dr P.C. Taylor (University of Hertfordshire)

### ***Short-term visitors***

Dr N. Al-Kandari (University of Kuwait, Kuwait)  
Professor E. Bura (George Washington University, USA)  
Dr S. Dossou-Gbété (Université de Pau et des Pays de l'Adour, France)  
Professor G. Haesbroeck (University of Liege, Belgium)  
Professor A. Pires (Technical University of Lisbon, Portugal)  
Professor M. Schyns (University of Namur, Belgium)

### ***Full-time research students***

Mr C. Banks (joint with Earth Sciences)  
Mr D.J. Jenkinson (from October)  
Mr E. Mubwandarikwa  
Mr P. Musonda (from October)  
Mr A. Sarkar (joint with Computing)  
Mrs L. Sun  
Mr B.J. Wright

### ***Part-time research students***

Ms H. Beaumont (from April)  
Ms J. Burrett (to June)  
Mr A. Garrett  
Ms A. Gjini  
Dr M. King  
Mr M. Lunt (to March)

Mr B.E.T.H. Twala

### **Support staff**

Ms E. Ostrowski, Departmental Secretary (to June)

Mrs V. Spearman, Departmental Secretary (from November)

## **2. Introduction**

2003 was, inevitably, another active year for the Department in both research and teaching.

In the course of the year, members of the Department published 22 papers in refereed journals and 5 in conference proceedings or book chapters. As always, research activities were very much to the fore in the daily life of the Department. We hosted 6 overseas visitors while members of the Department presented their work in Belgium, Canada, Germany, Holland, Italy, Kuwait, South Africa, Spain, Sweden, the US and, of course, the UK.

Also in 2003, the Department hosted the international conference "Practical Bayesian Statistics 5"; this was an unqualified success.

Our teaching continued to flourish. We presented two new second-level courses, [M248](#) Analysing Data and [BM240](#) Quantitative Methods in Business for the first time in 2003. Altogether the Department's five courses attracted a total of more than 2,400 students, almost 2,000 of whom were in the U.K.

It is, however, with the deepest regret that we record the premature death of our friend and colleague Liz Ostrowski who worked in the Faculty of Mathematics in various secretarial capacities for about 25 years and served the Statistics Department as departmental secretary for the last 16 years. Liz was a truly excellent secretary and an extremely popular person who bore her various illnesses, including the last, with great fortitude and a wonderfully positive and jolly demeanour. She is sorely missed.

The Department is very grateful to the several temporary secretaries and other departmental secretaries within the Faculty for their efforts and assistance in 2002 and 2003. We warmly welcome Val Spearman as our new departmental secretary from November.

Jane Williams, who served for a number of years as Staff Tutor in the OU's South West region, left the Department at the end of the year to take up a senior position in the Open University in Wales. We wish her well.

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

## **3. Teaching**

### **Presentation**

The Department presented five courses (30 CATS points each): [BM240](#) *Quantitative Methods in Business*, [MDST242](#) *Statistics in Society*, [M248](#) *Analysing Data*, [M343](#) *Applications of Probability* and [M346](#) *Linear Statistical Modelling*. M248 replaced and updated our successful course M246 Elements of Statistics, while BM240 is an additional offering.

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 Daniel Henderson and Jane Williams were involved.

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

MDST242, M248 and M343 were also presented to students of the Singapore Institute of Management.

### **Production**

Plans for, and initial work on, a brand new second-level course in Statistics, M249, tentatively entitled *Exploring Statistics*, were finalised and started, respectively! The course is to follow on from M248 *Analysing Data*. It will consist of four blocks on the topics of Bayesian Statistics, medical statistics, multivariate statistics and time series analysis. On completion, M249 will round off the undergraduate Diploma in Statistics (by replacing the elective element; see below) and will also form a core component of other degrees involving Statistics.

### **Other**

The undergraduate [Diploma in Statistics](#) is currently awarded to students who successfully study M248 or BM240, M343 and M346 (or their predecessors) plus one other course from a list of electives. The latest available figures are that 101 students were awarded the Diploma in 2002/03.

Our courses are core components of degrees in Mathematical Sciences and Economics and Mathematical Sciences while BM240 is part of the BA in Business Studies. It has been agreed that there will be a degree in Mathematics and Statistics coming on stream in 2007.

## **4. PhDs awarded**

A PhD was awarded to Mark Lunt for his thesis *Statistical Methods of Detecting Vertebral Fractures* (supervisors: D.J. Hand, Imperial College, and F. Critchley).

A PhD was awarded to Julie Burrett for her thesis *Identification of Randomized Trials for Inclusion in Meta-Analyses of Treatments for Childhood Acute Lymphoblastic Leukaemia, and Investigations of Factors Leading to Publication Bias* (supervisors: A.D. Lunn, University of Oxford, M.J. Clarke, Radcliffe Infirmary, Oxford, and P.H. Garthwaite).

## **5. Research interests**

The Department is home to three Research Groups:

*Multivariate Statistics* (Critchley (chair), Faria, Garthwaite, Gower, Jones, Larsen (University of Southern Denmark), 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).

*Medical Statistics* (Vines (chair), Farrington, Garthwaite, Kanaan (American University of Beirut), Whitaker).

Clearly, these three general groupings cover a huge variety of research projects in Statistics. Research also continues, of course, on topics not covered by these Research Groups, of which distribution theory, kernel smoothing, robust statistics, time series forecasting and influence analysis are but a small sample of topics. Strong ongoing collaborations continue in areas such as medicine, psychology, ecology and archaeology.

For details, see the publications, talks and other items to follow.

## 6. Publications

### 6.1 Publications in refereed academic journals

Andrews, N.J., Farrington, C.P., Ward, H.T.J., Cousens, S.N., Smith P.G., Molesworth A.M., Knight, R.S.G., Ironside J.W. & Will, R.G. (2003) Deaths from variant Creutzfeldt-Jakob disease in the UK. *Lancet*, 361, 751-752.

Bertie, A. & Farrington, P. (2003) Teaching confidence intervals with Java applets. *Teaching Statistics*, 25, 70-74.

Biss, P., Freeland, J., Silvertown, J., McConway, K. & Lutman, P. (2003) Successful amplification of rice chloroplast microsatellites from century-old grass samples from the Park Grass Experiment. *Plant Molecular Biology Reporter*, 21, 249-257.

Crawford, J.R., Garthwaite, P.H. & Gray, C.D. (2003) Wanted: fully operational definitions of dissociations in single case studies. *Cortex*, 39, 357-370.

Crawford, J.R., Garthwaite, P.H., Howell, D.C. & Venerri, A. (2003) Intra-individual measures of association in neuropsychology: inferential methods for comparing a single case with a control or normative sample. *Journal of the International Neuropsychological Society*, 9, 989-1000.

Farrington, C.P. (2003) On vaccine efficacy and reproduction numbers. *Mathematical Biosciences*, 185, 89-109.

Farrington, C.P., Kanaan, M.N. & Gay, N.J. (2003) Branching process models for surveillance of infectious diseases controlled by mass vaccination. *Biostatistics*, 4, 279-295.

Farrington, C.P. & Whitaker, H.J. (2003) Estimation of effective reproduction numbers for infectious diseases using serological survey data. *Biostatistics*, 4, 621-632.

Gower, J.C. & de Rooij, M. (2003) A comparison of the multidimensional scaling of triadic and dyadic distances. *Journal of Classification*, 20, 115-136.

Hubbard, R., Farrington, P., Smith, C., Smeeth, L. & Tattersfield, A. (2003). Exposure to tricyclic and selective serotonin reuptake inhibitor antidepressants and the risk of hip fracture. *American Journal of Epidemiology*, 158, 77-84.

In-Sun, N., Mengersen, K. & Garthwaite, P.H. (2003) Multivariate meta-analysis. *Statistics in Medicine*, 22, 2309-2333.

Jones, M.C. & Faddy, M.J. (2003) A skew extension of the t distribution, with applications. *Journal of the Royal Statistical Society, Series B*, 65, 159-174.

Jones, M.C. & Koch, I. (2003) Dependence maps: local dependence in practice. *Statistics and Computing*, 13, 241-255.

Park, B.U., Jeong, S.O., Jones, M.C. & Kang, K.H. (2003) Adaptive variable location kernel density estimators with good performance at boundaries. *Journal of Nonparametric Statistics*, 15, 61-75.

de Rooij, M. & Gower, J.C. (2003) The geometry of triadic distances. *Journal of Classification*, 20, 181-220.

Samuels, D.C., Boys, R.J., Henderson, D.A. & Chinnery, P.F. (2003) A compositional segmentation of the human mitochondrial genome is related to heterogeneities in the guanine mutation rate. *Nucleic Acids Research*, 31, 6043-6052.

Sims, H.J. & McConway, K.J. (2003) Non-stochastic variation of species-level diversification rates within angiosperms. *Evolution*, 57, 460-479.

Tata, L.J., West, J., Harrison, T., Farrington, P., Smith, C. & Hubbard, R. (2003) Does influenza vaccination increase consultations, corticosteroid prescriptions or exacerbations in people with asthma or chronic obstructive pulmonary disease? *Thorax*, 58, 835-839.

Wang, D.Q., Critchley, F. & Smith, P.J. (2003) Multiple set deletion measures and masking in regression. *Communications in Statistics - Theory and Methods*, 32, 407-413.

Whitaker H.J., Nieuwenhuijsen, M.J. & Best, N.G. (2003) The relationship between water concentrations and individual uptake of chloroform: a simulation study. *Environmental Health Perspectives*, 111, 688-694.

Whitaker H.J., Nieuwenhuijsen, M.J., Best, N.G., Fawell, J., Gowers, A. & Elliott, P. (2003) Description of trihalomethane levels in three UK water suppliers. *Journal of Exposure Analysis and Environmental Epidemiology*, 13, 17-23.

Williams-Thorpe, O., Webb, P.C. & Jones, M.C. (2003) Non-destructive geochemical and magnetic characterisation of Group XVIII dolerite stone axes and shaft-hole implements from England. *Journal of Archaeological Science*, 30, 1237-1267.

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

Critchley, F. (2003) On ziggurats and dendrograms. In *Between Data Science and Applied Data Analysis* (eds M Schader, W Gaul & M Vichi), Springer, 191-200.

Farrington, C.P. & Andrews, N.J. (2003) Statistical aspects of detecting infectious disease outbreaks. In *Monitoring the Health of Populations: Statistical Principles and Methods* (eds R. Brookmeyer & D. Stroup), Oxford University Press, 203-231.

Farrington, C.P. & Miller, E. (2003) Clinical trials. In *Methods in Molecular Medicine: Vaccine Protocols*, Second Edition (eds A. Robinson, M.J. Hudson & M.P. Cranage), Humana Press, 335-351.

Gower, J.C. (2003) Unified biplot geometry. In *Developments in Applied Statistics* (eds A. Ferligoj & A. Mrvar), Department of Social Sciences, University of Ljubljana, 3-22.

Gower, J.C. (2003) Visualisation in multivariate and multidimensional data analysis. In *Bulletin of the International Statistical Institute*, 54, 101-104.

## 7. Seminars and conferences at the Open University

As already mentioned, in July 2003, the Department hosted the international conference "Practical Bayesian Statistics 5". Particular thanks are due to the conference organising committee chaired initially by Catriona Queen and later by Daniel Henderson. For a full list of speakers, titles, abstracts, committee members and sponsors, see the conference website at <http://statistics.open.ac.uk/PBS5>.

The Department also ran its seminar programme with invited external speakers. Over the year we heard:

Rachel Hilliam (University of Birmingham) *Statistical aspects of chaos with applications to communication modeling*

Alan Girling (University of Birmingham) *Rank tests for ROC curves*

Ana Pires (Technical University of Lisbon, Portugal) *A closer look at confidence intervals for a binomial proportion*

Richard Boys (University of Newcastle) *Stochastic modelling and inference for simple genetic regulatory networks*

Barbel Finkenstadt (University of Warwick) *Time series modelling of disease transmission*

We also ran two internal research sessions during the year. Speakers were Chris Jones, John Gower, Paddy Farrington, Emmanuel Mubwandarikwa, Linjuan Sun and Ben Wright.

## 8. Conference papers presented

### F. Critchley

International Conference on Robust Statistics, Antwerp, Belgium. *Smooth optimisation for the MCD estimator*

Paradigms of Model Building Workshop, Dortmund, Germany. *Something beginning with groups ...*

### C.P. Farrington

Workshop on the Spread of Infectious Diseases: Mathematical Modelling and Statistical Analysis, Mariefred, Sweden. *Analysis of serological survey data*

Scottish and Northumbrian Academic Statisticians' Meeting, St Andrews. *Statistical methods for the surveillance of infectious diseases.*

### P.H. Garthwaite

Practical Bayesian Statistics V, Open University. *Quantifying opinion about a logistic regression using interactive graphics.*

### J.C. Gower

Conference on Correspondence Analysis and Related Methods, Barcelona, Spain. *Non-orthogonality in correspondence analysis.*

International Meeting of the Psychometric Society, Cagliari, Sardinia, Italy. *Group-average models.*

54th Congress of the International Statistical Institute, Berlin, Germany. *Visualisation in multivariate and multidimensional data analysis.*

#### **D.A. Henderson**

Practical Bayesian Statistics V, Open University. *Compositional segmentation of genome sequences.*

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

Seventh Purdue Symposium on Statistics, Purdue University, West Lafayette, Indiana, USA. *From order statistics back to ordinary statistics.*

Symposium on Distribution Theory, McMaster University, Hamilton, Ontario, Canada. *From order statistics back to ordinary statistics.*

54th Congress of the International Statistical Institute, Berlin, Germany. *Bivariate distributions with support above the diagonal.*

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

#### **F. Critchley**

Katholiek Universitat Leuven, Belgium: *Optimal simple principal component analysis.*

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

MRC Biostatistics Unit, Cambridge: *Statistical methods for the surveillance of vaccine-preventable infections.*

RSS Meeting on Performance Monitoring, London: *Monitoring the performance of vaccination programmes.*

RSS Meeting on the MMR and Autism Controversy, London: *A personal experience of the MMR vaccine and autism controversy.*

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

University of Kuwait, Kuwait: *Bayesian analysis of misclassified binary data from case-control studies with a validation sub-study.*

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

Rotterdam, Holland: *Biplot workshop.*

Barcelona, Spain: *Biplot workshop.*

Stellenbosch, South Africa: *Biplot workshop.*

## **10. Editorships**

#### **F.Critchley**

- Editorial board member: *Studies in Classification, Data Analysis, and Knowledge Organization* (book series, Springer-Verlag).

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

- Associate Editor: *Journal of the Royal Statistical Society, Series B*
- Associate Editor: *Statistics in Medicine*
- Associate Editor: *Lifetime Data Analysis*
- Associate Editor: *Epidemiology and Infection*

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

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

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

- Associate Editor: *Journal of Classification*
- Associate Editor: *The Mathematical Scientist*

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

- Associate Editor: *Communications in Statistics*
- Associate Editor: *Journal of Nonparametric Statistics*
- Associate Editor: *Statistica Sinica*
- Associate Editor: *Statistical Methodology*

## **11. Grants Awarded**

### **F. Critchley**

Steering Committee Member of European Science Foundation Network, €80,000. TOPIC: Statistical Analysis of Complex Data with Robust and Related Statistical Methods.

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

Wellcome Trust £111,678. TOPIC: Development of the Self-Controlled Case Series Method for Evaluating Vaccine Safety.

EPSRC CASE studentship with GlaxoSmithKline £44,700 (EPSRC) plus £24,000 (GSK). TOPIC: Validation and Extension of the Self-Controlled Case Series Method.

### **C.P. Farrington, D.A. Henderson & H.J. Whitaker**

(Initial approval given) EU Framework Programme 6: Improving Public Health Policy in Europe through Modelling and Economic Evaluation of Interventions for the Control of Infectious Diseases (POLYMOD). OU share €50,000.

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

Jointly with the Universities of Sheffield, Essex and Leeds, £200,000 from the NHS Research Methodology Programme (£150,000) and the Centre for Bayesian Statistics and Health Economics (£50,000) for a review and primary research into the elicitation of individuals' (Bayesian) prior probabilities.



Project leader for grant of £116,752 from HEFCE for a Science Research Investment Fund grant to refurbish unsuitable accommodation to support a new computing network for faculty-wide research.

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

With Celia Davies (School of Health and Social Welfare, OU) Paul Anand, Janet Newman and Grahame Thompson (all Faculty of Social Sciences, OU) and John Storey (School of Management, OU), £74,000 from NHS Service Delivery and Organisation R&D. TOPIC: The Incentive Effects of Different Forms of Governance in Health and Social Care.

## **12. Other activities**

### **F. Critchley**

- is an assessor, Civil Service Selection Board for fast stream statisticians

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

- is a member of the RSS Research Section Committee
- is a member of the WHO Global Advisory Committee on Vaccine Safety.
- is a member of the WHO Ad-Hoc Committee on EPI Serology in Relation to Intermittent Preventive Treatment of Malaria in Infants
- was a special adviser to WHO, mission to Montpellier
- is a member of the Department of Health's Spongiform Encephalopathy Advisory Committee (SEAC) Epidemiology Subgroup
- acted as expert adviser for the Defence in litigation over the MMR vaccine and autism
- examined a PhD at the London School of Hygiene and Tropical Medicine
- is an honorary member of the Faculty of Public Health Medicine and lectured at the London School of Hygiene and Tropical Medicine

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

- is external examiner for undergraduate mathematics courses at the University of Durham
- is a member of the EPSRC College for peer review of grant applications

### **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 a PhD at the University of Leeds

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

- completed term as external examiner for undergraduate statistics courses at Imperial College of Science and Technology, London
- completed term as a member of the Institute of Mathematical Statistics Committee on Fellows
- examined a PhD for the National College of Business Administration and Economics, Lahore, Pakistan

#### **C.M. Queen**

- is a member of the EPSRC College for peer review of grant applications

#### **S.K. Vines**

- was secretary and then chair of the RSS General Applications Section Committee

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

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