

The Open University Statistics Department 2004 Report

Membership

Professor P.H. Garthwaite (Head of Department)
Professor F. Critchley
Dr A.E. Faria
Professor 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
Dr S.K. Vines
Dr H.J. Whitaker

Long-term visitor

Dr P.C. Taylor (University of Hertfordshire)

Short-term visitors

Dr S. Gardner (University of Stellenbosch, South Africa)
Dr L.J. Tata (University of Nottingham)

Full-time research students

Mr C. Banks (joint with Earth Sciences)

Mr D.J. Jenkinson

Mr P.J. Johnston-Wilder (join with Mathematics Education to August)

Mr E. Mubwandarikwa

Mr P. Musonda

Mr A. Sarkar (joint with Computing)

Mrs L. Sun (to November)

Mr B.J. Wright (to October)

Part-time research students

Ms H. Beaumont

Mr A. Garrett

Ms A. Gjini

Mr G. Kafatos

Dr M. King (to November)

Mr A. Owen (from October)

Mr B.E.T.H. Twala

Support staff

Mrs V. Spearman, Departmental Secretary

2. Introduction

2004 was, inevitably, another active year for the Department in both research and teaching.

In the course of the year, members of the Department published a book, 23 papers in refereed journals and 4 in conference proceedings. Of our papers, no fewer than 4 appeared in *Biometrika*, 2 in the *Journal of the American Statistical Association*, 2 in *Biometrics* and 2 (one of those in *Biometrics* and one other) were invited discussion papers.

At the end of the year, an immensely successful one-day meeting on the *History of Statistics 1900 ± 30* was held, jointly with the Open University Centre for the History of the Mathematical Sciences.

Our teaching continued to flourish. We ran five 30 point courses, three at second level and two at third, as well as contributing to other courses in Faculty and University. The Department's five main courses attracted a total of just over 2,000 students.

Alvaro Faria and Paul Garthwaite run, as they have for a few years, a Statistical Advisory Service to support research in other departments at the Open University.

We warmly congratulate Paddy Farrington on his thoroughly deserved promotion to Professor in December. We were sorry, however, that Daniel Henderson was tempted back to Newcastle and left us at the end of the year.

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*. *M343* is currently a particular success story in terms of ever-increasing student numbers.

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 Catriona Queen were involved.

Kevin McConway contributed to the presentation of U205 *Health and Disease*.

Production

Work on a brand new second-level course in Statistics, M249, entitled *Practical Modern Statistics*, continued apace. The course will be presented for the first time in 2007. 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.

Work started on a new 10 CATS point Level 1 course for science, mathematics and health students tentatively entitled *Chance, Risk and Health* (code SMK184).

Kevin McConway revised two units on statistics for MU120 *Open Mathematics*.

Awards

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. Degrees in Mathematics and Statistics and Computing and Statistics were introduced during 2004 and will have their first graduates in 2007.

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 122 students were awarded the Diploma in 2003/04.

4. PhDs awarded

A PhD was awarded to Martin King for his thesis *Markov Chain Monte Carlo Analyses of Longitudinal Biomedical Magnetic Resonance Data* (supervisors: M.J. Crowder and D.J. Hand, Imperial College, and M.C. Jones).

5. Research interests

The Department is home to three Research Groups:

Multivariate Statistics (Critchley (chair), Faria, Garthwaite, Gower, Jones, Queen, Sun, Taylor, 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 (Whitaker (chair), Farrington, Garthwaite, Jenkinson, Musonda, Vines).

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 Book

Gower, J.C. & Dijkstrahuis, G.B. (2004) *Procrustes Problems*. Oxford University Press.

6.2 Publications in refereed academic journals

Boys, R.J. & Henderson, D.A. (2004) A Bayesian approach to DNA sequence segmentation. Discussion Paper. *Biometrics*, 60, 573-588.

Crawford, J.R. & Garthwaite, P.H. (2004) Statistical methods for single-case studies in neuropsychology: comparing the slope of a patient's regression line with those of a control sample. *Cortex*, 40, 533-548.

Crawford, J.R. Garthwaite, P.H., Howell, D.C. & Gray, C.D. (2004) Inferential methods for comparing a single case with a control sample: modified t-tests versus Mycroft et al's (2002) modified ANOVA. *Cognitive Neuropsychology*, 21, 750-755.

Critchley, F. & Marriott, P. (2004) Data informed influence analysis. *Biometrika*, 91, 125-140.

Farrington, C.P. (2004) Control without separate controls: Evaluation of vaccine safety using case-only methods. *Vaccine*, 32, 1064-1070.

Folb P.I., Bernatowska E., Chen R., Clemens J., Dodoo A.N., Ellenberg S.S., Farrington C.P., John T.J., Lambert P.H., Macdonald N.E., Miller E., Salisbury D., Schmitt H.J., Siegrist C.A. & Wimalaratne O. (2004) A global perspective on vaccine safety and public health: the Global Advisory Committee on Vaccine Safety. *American Journal of Public Health*, 94, 1926-1931.

Garthwaite, P.H. & Crawford, J.R. (2004). The distribution of the difference between two *t*-variates and application to a test for dissociations. *Biometrika*, 91, 987-994.

Gay, N.J., DeSerres, G., Farrington, C.P., Redd, S. & Papania, M. (2004) Assessment of the status of measles elimination from reported outbreaks: United States, 1997-1999. *Journal of Infectious Diseases*, 189, 36-42.

Gower, J.C. (2004) The geometry of biplot scaling. *Biometrika*, 91, 705-714.

Jones, M.C. (2004) Families of distributions arising from distributions of order statistics. Discussion paper. *Test*, 13, 1-43.

Jones, M.C. (2004) On some expressions for variance, covariance, skewness and kurtosis. *Journal of Statistical Planning and Inference*, 126, 97-106.

Jones, M.C. (2004) The Mobius distribution on the disc. *Annals of the Institute of Statistical Mathematics*, 56, 733-742.

Jones, M.C. & Larsen, P.V. (2004) Multivariate distributions with support above the diagonal. *Biometrika*, 91, 975-986.

McConway, K.J. & Sims, H.J. (2004) A likelihood-based method for testing for nonstochastic variation of diversification rates in phylogenies. *Evolution*, 58, 12-23.

Razzell, P., Spence, C. & Vines, K. (2004) Poverty, birthweight and infant weight gain in Hertfordshire, 1923-1939. *International Journal of Epidemiology*, 33, 1228-1233.

Signorini, D.F. & Jones, M.C. (2004) Kernel estimators for univariate binary regression. *Journal of the American Statistical Association*, 99, 119-126.

Smeeth, L., Thomas, S.L., Hall, A.J., Hubbard, R., Farrington, C.P. & Vallance, P. (2004) Risk of myocardial infarction and stroke after acute infection or vaccination. *New England Journal of Medicine*, 351, 2611-2618.

Wang, D.Q., Critchley, F. & Liu, I. (2004) Diagnostic analysis and perturbations in a clustered sampling model. *Communications in Statistics – Theory and Methods*, 33, 2709-2721.

Whitaker, H.J. & Farrington, C.P. (2004) Estimation of infectious disease parameters from serological survey data: the impact of regular epidemics. *Statistics in Medicine*, 23, 2429-2443.

Whitaker, H.J. & Farrington, C.P. (2004) Infections with varying contact rates: application to varicella. *Biometrics*, 60, 615-623.

Williams-Thorpe, O., Potts, P.J. & Jones, M.C. (2004) Non-destructive provenancing of bluestone axe-heads in Britain. *Antiquity*, 78, 359-379.

Yu, K. & Jones, M.C. (2004) Likelihood-based local linear estimation of the conditional variance function. *Journal of the American Statistical Association*, 99, 139-144.

Zaaijer, H.L., Koppelman, M.H.G.M. & Farrington, C.P. (2004) Parvovirus B19 viraemia in Dutch blood donors. *Epidemiology and Infection*, 132, 1161-1166.

6.3 Refereed or invited conference contributions and book chapters

Critchley, F., Schyns, M., Haesbroeck, G., Kinns, D., Atkinson, R.A. & Lu, G. (2004) The case sensitivity function approach to diagnostic and robust computation: a relaxation strategy. In *COMPSTAT: Proceedings in Computational Statistics*, ed: J. Antoch, pp. 113-125.

DeRoeck, A., Sarkar, A. & Garthwaite, P.H. (2004) Frequent term distribution measures for dataset profiling. In *Proceedings of the Fourth International Conference on Language Resources and Evaluation*, eds: M.T. Lino, M.F. Xavier, F. Ferreira, R. Costa and R. Silva, ELRA, Paris, pp. 1647-1650.

DeRoeck, A., Sarkar, A. & Garthwaite, P.H. (2004) Defeating the homogeneity assumption. *Seventh International Conference on the Statistical Analysis of Textual Data (JADT)*, eds: G. Purnelle, C. Fairo and A. Dister, UCL Presses Universitaires, Louvain, pp. 282-294.

Gower, J.C. (2004) Classifying classification problems. In *Comptes Rendus des Iles Rencontres de la Societe Francophone de Classification*, eds: M. Chavent, O. Dordan, C.C. Lacomblez, M. Langlais & B. Patouille, pp. 41-47.

6.4 Letters to Journal Editors and Invited Discussion Contributions

Farrington, C.P. (2004) Comments on the papers by Griggs and Farewell and Marshall et al. *Journal of the Royal Statistical Society, Series A*, 167, 562-563.

Farrington, C.P. (2004) Risk analysis of aseptic meningitis after measles-mumps-rubella vaccination in Korean children by using a case-crossover design (Letter). *American Journal of Epidemiology*, 1589, 717-718.

Jones, M.C. (2004) Letter commenting on Hazelton, M.L. (2003), "A graphical tool for assessing normality", *The American Statistician*, 58, 176-177.

Jones, M.C. (2004) The moments of the beta-normal distribution with integer parameters are the moments of order statistics from the normal distribution (Letter). *Communications in Statistics – Theory and Methods*, 33, 2869 -2870.

7. Seminars and conferences at the Open University

As already mentioned, on 15th December, we ran an extremely successful one-day conference (with 94 attendees) on *The History of Statistics, 1900 ± 30*, in conjunction with the University's Centre for the History of the Mathematical Sciences. Chief organisers were Chris Jones and Val Spearman with input from John Gower and Jeremy Gray. Speakers were:

Anthony Edwards (Gonville & Caius College, Cambridge) *John Venn as statistician*

Chris Pritchard (McLaren High School, Callander) *Francis Galton and George Darwin's 'common family weakness for statistics'*

Eileen Magnello (University College London) *Karl Pearson and the origin of modern statistics: an elastician becomes a statistician*

David Cox (Nuffield College, Oxford) *Statistical theory and methods in the first third of the 20th century*

John Aldrich (University of Southampton) *Information and economics in Fisher's design of experiments*

Stephen Senn (University of Glasgow) *An early 'Atkins diet'; R.A.Fisher analysis a medical 'experiment'*.

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

Steve Brooks (University of Cambridge) *Five years of Bayesian marking (and counting)*

Qiwei Yao (London School of Economics) *Spatial modelling: parametric and semi parametric approaches*

Chris Holmes (University of Oxford) *Bayesian co-clustering of multiple gene expression time profiles within and across treatments*

Azra Ghani (Imperial College London) *Mechanisms and efficiency of the transmission of SARS: an epidemiological perspective*

Elena Stanghellini (Università di Perugia, Italy) *On some recent results for directed acyclic graphs*

Howard Grubb (University of Reading) and Mario Cortina-Borja (University College London) *Seasonality and age at death in Scotland 1974-2001*

Sugnet Gardner (University of Stellenbosch, South Africa) *Practical visualisation of multi-dimensional reality with biplots*

Mark Steel (University of Warwick) *Non-Gaussian Bayesian geostatistical modelling*

Chris Brunsdon (University of Glamorgan) *Sharpe space analysis and regions on maps*

Simon French (Manchester Business School) *A Bayesian looks at e-democracy*

The first of what is intended to be an Annual Research Students' Research Day was held, and greatly appreciated, in July. Speakers were:

Emanuel Mubwandarikwa, David Jenkinson, Andy Garrett, Avik Sarkar, Chris Banks, Patrick Musonda and Peter Johnston-Wilder.

And at an internal research morning, the speakers were John Gower, Heather Whitaker, Kevin McConway and Chris Jones.

8. Conference papers presented

F. Critchley

Belgian Statistical Society Annual Meeting, Vielsam, Belgium *Skewness a la mode?*

COMPSTAT 2004, Prague, Czech Republic *The case sensitivity function approach to diagnostic and robust computation: a relaxation strategy*

C.P. Farrington

6th World Congress of the Bernoulli Society and Annual Meeting of the Institute of Mathematical Statistics, Barcelona, Spain *Estimation of contact parameters for non-stationary infections*

International Conference on Statistics in the Health Sciences, Nantes, France *Evaluation of vaccine and drug reactions using the self-controlled case series method*

4th International Symposium on Pneumococci and Pneumococcal Disease (ISPPD-4), Helsinki, Finland *What is the reproduction for pneumococcae infection and does it matter?*

J.C. Gower

Societe Francophone de Classification 04, Bordeaux, France *Classifying classification problems*

South African Statistical Association Annual Conference, Bloemfontein, South Africa
Using Procrustes analysis for a synthesis of canonical variate analysis and generalised canonical correlation analysis

D.A. Henderson

International Biometric Society Conference, Cairns, Australia *A Bayesian approach to DNA sequence segmentation (with formal discussion)*

M.C. Jones

2nd International Workshop in Applied Probability, Piraeus, Greece *Bivariate (and univariate) families of distributions arising from order statistics*

International Conference on Distribution Theory, Order Statistics and Inference in Honour of Barry C Arnold, Santander, Spain *The sinh arcsinh transformation*

S.K. Vines

Workshop on Robustness in High Dimensional Data, Vorau, Austria *Simple principal components and beyond ...*

H.J. Whitaker

25th Annual Conference of the International Society for Clinical Biostatistics, Leiden, The Netherlands *Infections with varying contact rates: application to varicella*

9. Other seminars, workshops and talks given

F. Critchley

Imperial College London *Some applications of group invariance to statistics*

University of Oxford *Some applications of group invariance to statistics*

Victoria University of Wellington, New Zealand *Skewness a la mode?*

Victoria University of Wellington, New Zealand *The case sensitivity function approach to diagnostic and robust computation: a relaxation strategy*

C.P. Farrington

Ludwig-Maximilians-Universitat, Munich, Germany *Estimation of varying contact rates in epidemic models for large populations*

University of East London *MMR vaccine safety: an epidemiological perspective*

Ecole Polytechnique Federale de Lausanne, Switzerland *Estimation of transmission parameters for endemic infectious diseases*

Health Protection Agency, London *Estimation for non-stationary infections*

Royal Statistical Society Medical Section, London *Surveillance of infections controlled by vaccination*

M.C. Jones

Imperial College London *From order statistic distributions back to ordinary statistical distributions.*

S.K. Vines

University of Liege, Belgium *Simplifying principal components and beyond ...*

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*

Editorial Board Member : *Statistics in Medicine*

Editorial Board Member : *Lifetime Data Analysis*

Editorial Board Member : *Epidemiology and Infection*

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: *Journal of Statistical Planning and Inference*

Associate Editor: *Sankhya*

Associate Editor: *Statistica Sinica*

Associate Editor: *Statistical Methodology*

11. Grants Awarded

F. Critchley

European Science Foundation SACD Network (£300) to participate in Robustness in High Dimensional Data workshop, Vorau, Austria.

D.A. Henderson

Royal Society travel grant (£972) to present paper at International Biometric Society conference in Cairns, Australia.

12. Other activities

F. Critchley

was 2004 Shayle R Searle Visiting Fellow, Victoria University of Wellington, New Zealand

visited University of Liège, Belgium

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 in Infants against Malaria

is a member of the Department of Health's Spongiform Encephalopathy Advisory Committee (SEAC) Epidemiology Subgroup

is an honorary member of the Faculty of Public Health Medicine

P.H. Garthwaite

is external examiner for undergraduate mathematics courses at the University of Southampton

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)

M.C. Jones

is listed in ISIHighlyCited.com

refereed 25 papers for journals whose editorial boards he is not on

examined 5 PhDs, for the Universities of Plymouth, Birmingham and Warwick and the London School of Economics, UK, plus the Indian Statistical Institute, Kolkata

acted as External adviser (Statistics) to the revalidation of the Mathematics and Statistics programme at the University of Plymouth

K.J. McConway

is Programme Director of the OU's Undergraduate Mathematics Programme Board

was academic consultant on the BBC4/OU television series Being Positive

examined a PhD at Imperial College London

C.M. Queen

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

S.K. Vines

was chair of the RSS General Applications Section Committee (to June)