

Professor Bernard Silverman FRS FAcSS

Bernard Silverman's undergraduate education was in Mathematics (Cambridge BA 1973, MMath 1974) and his postgraduate education and research (Cambridge PhD 1978) in Statistics. He has held senior academic posts at Bath, Bristol and Oxford, and has spent a substantial amount of time as a visitor at Stanford and various other universities in the USA and worldwide.

His current full-time post as Home Office Chief Scientific Adviser has several aspects: the provision of independent scientific advice to the Home Secretary and other Home Office ministers and policy officials on the whole range of topics relevant to Home Office business; the leadership and management of Home Office Science, which includes the Home Office Centre for Applied Science and Technology; Home Office Statistics; the Animals in Science Regulation Unit; and teams of social researchers, economists and operational researchers supporting Home Office policy and operations in Crime and Policing, Migration and Counter-Terrorism; support for and sponsorship of independent scientific advisory committees, including the Advisory Committee on the Misuse of Drugs; participation in the cross-government network of Chief Scientific Advisers chaired by the Government Chief Scientific Adviser; and international collaboration in scientific matters relevant to Home Office business, particularly with the US Department of Homeland Security.

Silverman is a highly cited researcher whose published work is centred on computational statistics, the understanding of new statistical methods made possible and necessary by constant increases in computational power. In addition, his work has ranged widely across theoretical and practical aspects of statistics, and Silverman has collaborated with researchers in many areas of medicine, social science, and the life and physical sciences. His research has been recognised by premier awards both in the UK and the USA. He is a Fellow of the Royal Society (FRS) and of the Academy of Social Sciences (AcSS), a Past President of the Royal Statistical Society and of the (US-based) Institute of Mathematical Statistics and has served as Chair of the United Kingdom Mathematics Trust (UKMT) and the Joint Mathematical Council of the United Kingdom. He is Chair of the United Kingdom Research Integrity Office, a member of the Council of the Arts and Humanities Research Council and of the Emerging Technologies and Industries Steering Group of the Technology Strategy Board, and has been a chair or member of numerous Royal Society and senior University Committees.

Before taking up his current post in April 2010, Silverman's work for government included membership of the GM Science Review Panel, a non-executive directorship of the Defence Analytical Services Agency, and chairmanship of a review panel for the project for the Sustainable Development of Heathrow. He has a substantial and broad record of providing statistical consultancy advice in many areas of industry and commerce as well as in financial and legal contexts.

Professor Bernard Walter Silverman FRS
Chief Scientific Adviser to the Home Office

Email: bernard.silverman@stats.ox.ac.uk

Web: www.bernardsilverman.com

Career

1970–73	Undergraduate, Jesus College, Cambridge
1973–74	Graduate Student, Jesus College, Cambridge
1974–75	Research Student, Statistical Laboratory, Cambridge
1975–77	Research Fellow of Jesus College, Cambridge
1976–77	Calculator Development Manager, Sinclair Radionics Ltd
1977–78	Junior Lecturer in Statistics, Oxford University and Weir Junior Research Fellow of University College, Oxford
1978–80	Lecturer in Statistics, University of Bath
1981–84	Reader in Statistics, University of Bath
1984 & 1992–93	Head of Statistics Group, University of Bath
1984–93	Professor of Statistics, University of Bath
1988–91	Head of School of Mathematical Sciences, University of Bath
1993–2003	Professor of Statistics, University of Bristol
1993–97 & 1998–99	Head of Statistics Group, University of Bristol
1999–2003	Henry Overton Wills Professor of Mathematics, University of Bristol ¹
2000–03	Provost of the Institute for Advanced Studies, University of Bristol
2003–09	Master of St Peter’s College, Oxford
2010–	Chief Scientific Adviser to the Home Office

Substantive degrees and qualifications²

1973	Bachelor of Arts, Cambridge (Wrangler)
1974	Master of Mathematics ³ , Cambridge (with Distinction)
1977	Doctor of Philosophy, Cambridge
1989	Doctor of Science, Cambridge
1993	Chartered Statistician, Royal Statistical Society
2000	Bachelor of Theology, Southampton ⁴ (First Class Honours)

Current Unpaid and Visiting Appointments

- Titular Professor of Statistics, University of Oxford
- Senior Research Fellow, Smith School of Enterprise and the Environment, Oxford⁵
- Professorial Research Associate, Wellcome Trust Centre for Human Genetics, Oxford³
- Associate Fellow, Green Templeton College, Oxford
- Visiting Professor of Linguistics and English Language, University of Lancaster

¹ Now emeritus.

² I also hold the Cambridge MA degree and, by incorporation, the Oxford degrees of MA, DPhil and DSc. Honorary degrees are listed below.

³ Degree conferred 2011. Formerly Part III of Mathematical Tripos.

⁴ Awarded through Southern Theological Education and Training Scheme, Salisbury.

⁵ Part-time appointment: currently on indefinite unpaid leave.

Awards and honours

1970	First Prize, International Mathematical Olympiad
1974	Mayhew Prize for Mathematical Tripos Part III, Cambridge
1976	Smith's Prize, Cambridge University
1984	Royal Statistical Society Guy Medal in Bronze
1985	Special Invited Paper ⁶ , Institute of Mathematical Statistics
1988	Technometrics Special Discussion Paper, American Statistical Association
1991	Presidents' Award of American Statistical Association, Institute of Mathematical Statistics, Biometric Society (ENAR and WNAR) and Statistical Society of Canada for 'the outstanding statistician under forty' (the COPSS award)
1993	Fulkerson Lecturer, Cornell University
1995	Royal Statistical Society Guy Medal in Silver
1997	Fellow of the Royal Society
1999	Special Invited Paper ⁶ , Institute of Mathematical Statistics
1999	Henri Willem Methorst Medal, International Statistical Institute
2000	Corcoran Lecturer, Oxford University
2001	Member of Academia Europæa
2002	Original Member, Highly Cited Researchers database, ISI ^{® 7}
2003	Honorary Fellow, Jesus College, Cambridge
2010	Honorary Fellow, St Chad's College, Durham
2014	Fellow of the Academy of Social Sciences
2014	Honorary Doctor of Science, St Andrews University

Past visiting appointments outside UK

1978 & 1979	Department of Statistics, Princeton University
1979	University of Paris VI
1980	Sonderforschungsbereich 123, University of Heidelberg
1981	Mathematics Research Center, University of Wisconsin–Madison
1981	Department of Statistics, Johns Hopkins University
1984	Depts of Statistics and Biostatistics, University of Washington
1984	University of Frankfurt
1985	University of California, San Diego
1985	CSIRO Division of Mathematics and Statistics, Canberra, Sydney, Melbourne and Perth
1987–2005	Department of Statistics, Stanford University ⁸
1991	Mathematical Sciences Research Institute, Berkeley
1997–98	Fellow, Center for Advanced Study in the Behavioral Sciences, Stanford, California ⁹

Almost all of these appointments were with some pay and were for periods of 1–3 months in each year shown.

⁶ These are now termed 'Institute Medallion Lectures'.

⁷ According to a survey published in the Higher Education Guardian, I was the third most cited British mathematician in the period 1981 to 2000. In the field of mathematics, I had the largest number of 'highly-cited' papers (defined as those in the top 1% of cited papers in the field).

⁸ Frequent visitor (on average for two months every alternate year).

⁹ Academic year.

Major Professional Activities

Royal Society: FRS (1997). Council Member (2009–10). Working Group on the State of the Nation in the teaching of Science and Mathematics (2007–10; Chair 2008–10). Wolfson Merit Awards Committee (2006–09). Dorothy Hodgkin Fellowships Committee A (1999–2004; chair 2003). Sectional Committee 1 (1998–2001; Chair 2001). Conference Grants Committee (1998–2001). Research Grants Committee A (1997–2000, Chair 1999–2000). Exhibitor, New Frontiers in Science Exhibition, 1999. Organizer, Discussion Meetings, 1988 & 1999.

Institute of Mathematical Statistics: President, 2000–01. Fellow (1987). Council (1991–94; 1997–2000; 2007–10.). Special Invited Papers Committee (1986–88). COPSS award nominating committee (Member 1995–97, Chair 1997). Editor, *Annals of Statistics* (2007–09). Many committees and working parties.

Royal Statistical Society: President, 2010. Honorary Secretary (1984–90). Council Member (1982–90). Research Section Committee (1979–82), and numerous other committees and working parties, in particular the 1990 Working Party on Official Statistics. Chair of Research Section (1991–93). Chair of 1995 Publications review and 2011 Honours review.

International Statistical Institute/Bernoulli Society: Fellow of ISI (1986). Bernoulli Society European Regional Committee (member 1986–92, chair 1988–90). Bernoulli Society Council (1999–2003). Founding organizer of European Young Statisticians' meeting, 1979.

Editorial work: Editor of Oxford University Press Statistical Science Series (1983–87). Associate Editor, *Annals of Statistics* (1982–85), *Journal of the Royal Statistical Society, Series B* (1980–84). Editor of *International Statistical Review* (1991–96). Editor of Chapman and Hall Monographs on Statistics and Applied Probability (1985–97) and Interdisciplinary Statistics Series (1993–97). Editor of Wiley Statistics Series (1997–2001). Editorial Board member of *Inverse Problems* (1998–2000). Editor of *IMS Bulletin* (2002–06). Editor of Cambridge University Press Statistics series (2003–09). Editor, *Annals of Statistics* (2007–09). Founding Editorial Committee, *Annual Review of Statistics and Its Application* (2012–).

External examining and assessment: Very wide portfolio of external examining at undergraduate, graduate and PhD level; external assessor for academic promotions in many universities. [Worldwide in both cases.]

National and international research administration: SERC Statistics Panel (1990–94). Frequent reviewer for (US) National Science Foundation, NSERC (Canada), Australian Research Council, etc. EPSRC Mathematics College (1994–97 & 2000–03). Frequent member and chair of grant awarding panels for EPSRC. Scientific Committee, EURANDOM, Netherlands (1997–2003). Statistics Research Assessment Panel for HEFCE 2001 Research Assessment Exercise. Scientific Steering Committee, Isaac Newton Institute, 2003–6. Steering Group, International Review of UK Mathematics, 2003–4. Chair, Subpanel 22 (Statistics) and Member, Panel F (Mathematics), HEFCE Research Assessment Exercise 2008. Council, Arts and Humanities Research Council (2012–). Convenor, Physical Sciences Panel, Hong Kong Research Assessment Exercise 2014.

Mathematics related activities: Patron, Royal Institution Wessex Mathematics Master Classes. Chair, Joint Mathematical Council of the United Kingdom (2003–06). Chair, United Kingdom Mathematics Trust (2004–10).

External consultancy and related work: Industrial consultancies in statistics, micro-electronics and mathematics for companies concerned with stockbroking, calculator and computer design, aerospace, oil exploration, advertising, railway signalling. A method designed for oil-well log interpretation was patented by the company involved. Consultancy on statistical aspects of legal cases (especially financial and forensic). Statistical advice to the press. Advice to police in criminal cases. Substantial long-term consultancies with Nuclear Electric, National Audit Office, Ministry of Defence, Agilent Technologies, Mass Spec Analytical Ltd. Radio and television programmes on statistics. Interviews with press and radio. Advisory Board, Statistics Department, Carnegie Mellon University (member 2002, academic chair 2006) and National University of Singapore (2010).

Work for UK Government prior to current appointment: GM Science Review Panel, 2002–3. Owner's Advisory Board member (non-executive director) Defence Analytical Services Agency (1998–2009). Consultant to the Statistics Commission, 2003. Consultant to UK Government Inquiry (the 'Lessons Learned' Inquiry) into Foot and Mouth Epidemic, 2002. Chair, Peer Review Panel on the Project for the Sustainable Development of Heathrow, 2005–06.

Policy advisory roles: British Academy Policy Centre Advisory Group (2010–13). Board of UCL Jill Dando Institute of Security and Crime Science (2010–). Emerging Technologies and Industries Steering Group, Technology Strategy Board (2012–).

Oxford University Committees: Council (2007–10). Educational Policy and Standards Committee (2007–8). Planning and Resource Allocation Committee. (2008–10), and member of Budget Subcommittee. Joint Resource Allocation Advisory Board (representing Chair of Conference of Colleges) 2008–09. Supervisory Committee for Permanent Private Halls (2007–10). Chair of Continuing Education Board (2008–10). Nominating committee for external members of Council (2008–10). Frequent review panels (eg Department of Mathematics, Oxford Internet Institute) and appointment panels (for both professorial and senior administrative appointments). ICT strategy steering group (representing Conference of Colleges), 2005–06. Distinctions Committee (Merit awards for established professors) 2006–08.

Publications

Books: authored

- 1986 *Density Estimation for Statistics and Data Analysis*. London: Chapman and Hall.
- 1994 (with P. J. Green) *Nonparametric Regression and Generalized Linear Models: A Roughness Penalty Approach*. London: Chapman and Hall.
- 1997 (with J. O. Ramsay) *Functional Data Analysis*. New York: Springer.
- 2002 (with J. O. Ramsay) *Applied Functional Data Analysis: Methods and Case Studies*. New York: Springer.
- 2005 (with J. O. Ramsay) *Functional Data Analysis, Second Edition*. (Revised and considerably extended). New York: Springer.

Books: edited

- 1989 (with G. A. Barnard, G. E. P. Box, D. R. Cox, and A. H. Seheult). *Industrial Quality and Productivity with Statistical Methods: A Joint Symposium of the Royal Society and the Royal Statistical Society*. London: The Royal Society. (Also published as *Phil. Trans. R. Soc. Lond. A*, **327**, 477–638.)
- 2000 (with J. C. Vassilicos). *Wavelets: The Key to Intermittent Information?*. Oxford University Press. (Also published as *Phil. Trans. R. Soc. Lond. A*, **357**, 2393–2625.)

Major published reports

- 2003 *GM Science Review: First Report*. Department of Trade and Industry, 296 pp.¹⁰
- 2004 *GM Science Review: Second Report*. Department of Trade and Industry, 116 pp.¹⁰
- 2007 *The UK's Science and Mathematics Teaching Workforce: a 'State of the Nation' Report*. The Royal Society, 109pp.¹¹
- 2008 *Science and mathematics education, 14–19: A 'state of the nation' report on the participation and attainment of 14–19 year olds in science and mathematics in the UK, 1996–2007*. The Royal Society, 199pp.¹¹
- 2011 *Research and Development in Forensic Science: a Review*¹². Home Office.

Refereed journal publications

1. On a Gaussian process related to multivariate probability density estimation. *Math. Proc. Camb. Phil. Soc.*, **80**, 135–144. (1976).
2. Limit theorems for dissociated random variables. *Adv. Appl. Prob.*, **8**, 806–819. (1976).
3. Weak and strong uniform consistency of the kernel estimate of a density and its derivatives. *Ann. Statist.*, **6**, 177–184. (1978).
4. Density ratios, empirical likelihood and cot death. *Applied Statistics*, **27**, 26–33. (1978).
5. Choosing a window width when estimating a density. *Biometrika*, **65**, 1–11. (1978).

¹⁰ Jointly authored: I took a lead role in drafting the summary versions.

¹¹ Authored by a Royal Society Working Group; see <http://royalsociety.org/education/policy/state-of-nation/>

¹² <http://www.homeoffice.gov.uk/publications/agencies-public-bodies/fsr/forensic-science-review/>

6. Distances on circles, toruses and spheres. *J. Appl. Prob.*, **15**, 136–143. (1978).
7. (with T.C. Brown). Short distances, flat triangles and Poisson limits. *J. Appl. Prob.*, **15**, 815–825. (1978).
8. (with F.J. Guild). The microstructure of glass fibre reinforced polyester. *Journal of Microscopy*, **114**, 131–141. (1978).
9. (with B.D. Ripley). Quick tests for spatial interaction. *Biometrika*, **65**, 641–2. (1978).
10. (with T.C. Brown). Rates of Poisson convergence for U statistics. *J. Appl. Prob.*, **16**, 428–432. (1979).
11. (with C.Y. Barlow and others). Grain to grain variations in NbC particle size in an austenitic stainless steel. *Journal of Materials Science*, **14**, 423–430. (1979).
12. (with P.J. Green). Constructing the convex hull of a set of points in the plane. *Computer Journal*, **22**, 262–266. (1979).
13. (with P.J.L. Wallis). Efficient implementation of the Ada overloading rules. *Information Processing Letters*, **10**, 120–123. (1980).
14. Some asymptotic properties of the probabilistic teacher. *IEEE Trans. Inf. Theory*, **26**, 246–249. (1980).
15. (with D.M. Titterton). Minimum covering ellipses. *SIAM J. Sci. Stat. Comp.*, **1**, 401–409. (1981).
16. Using kernel density estimates to investigate multimodality. *J. Roy. Statist. Soc. B*, **43**, 97–99. (1981).
17. (with H.W. Lotwick). Convergence of spatial birth-and-death processes. *Math. Proc. Camb. Phil. Soc.*, **90**, 155–165. (1981).
18. (with T.C. Brown and R.K. Milne). A class of two-type point processes. *Z. Wahrscheinlichkeitsth. verw. Geb.*, **58**, 299–308. (1981).
19. Kernel density estimation using the fast Fourier transform. Algorithm AS176, *Appl. Stat.*, **31**, 93–99. (1982).
20. (with M.H.J. Keenan and A.H. Rose). Effect of plasma-membrane phospholipid unsaturation of solute transport into *Saccharomyces cerevisiae* NCYC 366. *J. Gen. Microbiol.*, **128**, 1447–1455. (1982).
21. (with A. Wheals). Unstable activator model for size control of the cell cycle. *J. Theor. Biol.*, **97**, 505–510. (1982).
22. On the estimation of a probability density function by the maximum penalized likelihood method. *Ann. Statist.*, **10**, 795–810. (1982).
23. (with H.W. Lotwick). Methods for analysing spatial processes of several types of points. *J. Roy. Statist. Soc. B*, **44**, 406–413. (1982).
24. (with Y.P. Mack). Weak and strong uniform consistency of kernel regression estimates. *Z. Wahrscheinlichkeitsth. verw. Geb.*, **61**, 405–415. (1982).
25. Convergence of a class of empirical distribution functions of dependent random variables. *Ann. Probab.*, **11**, 745–751. (1983).
26. Spline smoothing: the equivalent variable kernel method. *Ann. Statist.*, **12**, 898–916. (1984).
27. A fast and efficient cross-validation method for smoothing parameter choice in spline regression. *J. Amer. Statist. Ass.*, **79**, 584–589. (1984).
28. (with A.J. Baddeley). A cautionary example on the use of second-order methods for analysing point patterns. *Biometrics*, **40**, 1089–1093. (1984).

29. Some aspects of the spline smoothing approach to non-parametric regression curve fitting (with Discussion). *J. Roy. Statist. Soc. B.*, **47**, 1–52. (1985).
30. Two books on density estimation. *Ann. Statist.*, **13**, 1630–1638. (1985).
31. (with J.D. Wilson). A beta-binomial model for library survey data. *Journal of Documentation*, **43**, 112–124. (1987).
32. (with J.T. Wood). The nonparametric estimation of branching curves. *J. Amer. Statist. Ass.*, **82**, 551–558. (1987).
33. (with G.A. Young). The bootstrap: to smooth or not to smooth? *Biometrika*, **74**, 469–479. (1987).
34. (with M.J. Buckley and G.K. Eagleson). The estimation of residual variance in nonparametric regression. *Biometrika*, **75**, 189–199. (1988).
35. (with J.H. Friedman). Flexible parsimonious smoothing and additive modeling (with Discussion and Response). *Technometrics*, **31**, 1–39. (1989).
36. (with M. C. Jones). An orthogonal series density estimation approach to reconstructing positron emission tomography images. *Journal of Applied Statistics*, **16**, 177–191. (1989).
37. (with M. C. Jones). E. Fix and J. L. Hodges (1951): an important unpublished contribution to nonparametric discriminant analysis and density estimation. *International Statistical Review*, **57**, 233–247. (1989).
38. (with M. C. Jones, J. D. Wilson and D. W. Nychka). A smoothed EM approach to indirect estimation problems, with particular reference to stereology and emission tomography (with Discussion). *J. Roy. Statist. Soc. B.*, **52**, 271–324. (1990).
39. (with I. M. Johnstone). Speed of estimation in positron emission tomography. *Ann. Statist.*, **18**, 251–280. (1990).
40. (with D.R. Cox, C.A. Moser, D. Hutchison, D. Holt, S. M. Gore and P.G. Moore) *Official Statistics: counting with confidence*. The Report of a Working Party on Official Statistics in the UK. London: Royal Statistical Society, (1990). Subsequently published as *J. Roy. Statist. Soc. A.*, **154**, 23–44. (1991).
41. (with J. A. Rice). Estimating the mean and covariance structure nonparametrically when the data are curves. *J. Roy. Statist. Soc. B.*, **53**, 233–244. (1991).
42. (with C. Jennison, J. Stander and T.C. Brown). The specification of edge penalties for regular and irregular pixel images. *IEEE Trans. Pattern Analysis and Machine Intelligence*, **12**, 1017–1024. (1990).
43. (with I. M. Johnstone). Discretization effects in statistical inverse problems. *J. Complexity*, **7**, 1–34. (1991).
44. (with C. K. Carter and G. K. Eagleson). A comparison of the Reinsch and Speckman splines. *Biometrika*, **79**, 81–91. (1992).
45. (with N. R. Franks, A. Wilby and C. Tofts). Self-organizing nest construction in ants: sophisticated building by blind bulldozing. *Animal Behaviour*, **44**, 357–375. (1992).
46. (with D. A. Cook, P. McCombie and D. Rattray) The measurement and checking of the accuracy of small strain measurements during testing of model brick walls. *Masonry International: Journal of the British Masonry Society*, **6**, 82–88. (1993).
47. (with S. E. Leurgans and R. A. Moyeed). Canonical correlation analysis when the data are curves. *J. Roy. Statist. Soc. B.*, **55**, 725–740. (1993).
48. (with S. D. Pezzulli). Some properties of smoothed principal components analysis for functional data. *Computational Statistics*, **8**, 1–16. (1993).

49. (with P. C. Taylor). Block diagrams and splitting criteria for classification trees. *Statistics and Computing*, **3**, 147–161. (1993).
50. (with J. Stander) Temperature schedules for simulated annealing. *Statistics and Computing*, **4**, 21–32. (1994).
51. (with G. P. Nason) The discrete wavelet transform in S. *J. Comp. Graph. Stat.*, **3**, 163–191. (1994).
52. (with L.J. Notarianni, S.E. Oliver, P. Dobrocky and P.N. Bennett) Caffeine as a metabolic probe: A comparison of the metabolic ratios used to assess CYP1A2 activity. *Br. J. Clin. Pharmacol.*, **39**, 65–69. (1995).
53. Incorporating parametric effects into functional principal components analysis. *J. Roy. Statist. Soc. B*, **57**, 673–689. (1995).
54. (with J. Stander) Minimax estimation of linear functionals, particularly in nonparametric regression and positron emission tomography. *Computational Statistics*, **10**, 259–283. (1995).
55. Smoothed functional principal components analysis by choice of norm. *Ann. Statist.*, **24**, 1–24. (1996).
56. (with D. Bloch) Monotone discriminant functions and their applications in rheumatology. (1997). *J. Amer. Statist. Assoc.*, **92**, 144–153.
57. (with I. M. Johnstone) Wavelet threshold estimators for data with correlated noise. (1997). *J. Roy. Statist. Soc. B*, **59**, 319–351.
58. (with J. O. Ramsay and N. Heckman) Spline smoothing with model-based penalties. *Behavior Research Methods, Instruments, and Computers*, **29**, 99–106. (1997).
59. (with F. Abramovich) Wavelet decomposition approaches to statistical inverse problems. *Biometrika*, **85**, 115–129. (1998).
60. (with A. M. Wilson, T. J. Seelig and R. A. Shield) The effect of foot imbalance on point of force application in the horse. *Equine Veterinary Journal*, **30**, 540–545. (1998).
61. (with F. Abramovich and T. Sapatinas) Wavelet thresholding via a Bayesian approach. (1998). *J. Roy. Statist. Soc. B*, **60**, 725–749.
62. (with J. O. Ramsay) The progesterone data: will simpler functional data analyses suffice? *J. Amer. Statist. Assoc.*, **93**, 988–990. (1998).
63. (with T. R. Downie) The discrete multiple wavelet transform and thresholding methods. (1998). *IEEE Transactions on Signal Processing*, **46**, 2558–2561.
64. (with G. N. Shuttleworth, D. H. W. Steel and R. A. Harrad) Patterns of III nerve synkinesis. *Strabismus*, **6**, 181–190. (1998).
65. (with L. Shepstone, J. Rogers, J. R. Kirwan) The shape of the distal femur: A palaeopathological comparison of eburnated and non-eburnated femora. *Annals of the Rheumatic Diseases*, **58**, 72–78. (1999).
66. (with G. E. Williams, A. M. Wilson and A. E. Goodship) Disease-specific changes in equine ground reaction force data documented by use of principal components analysis. *American Journal of Veterinary Research*, **60**, 549–555. (1999).
67. Wavelets in statistics: beyond the standard assumptions. *Phil. Trans. R. Soc. Lond. A* **357**, 2459–2473 (1999)
68. (with F. Abramovich and T. Sapatinas) Stochastic expansions in an overcomplete wavelet dictionary. *Probability Theory and Related Fields*, **117**, 133–144. (2000).

69. (with A. Kovac) Extending the scope of wavelet regression methods by coefficient-dependent thresholding. *J. Amer. Statist. Assoc.*, **95**, 172–183. (2000).
70. (with C. M. Swain and R. R. Rodgers) Life after Bakke Where Whites and Blacks Agree: Public Support for Fairness in Educational Opportunities. *Harvard BlackLetter Law Journal*, **16**, 147–184. (2000).
71. (with L. Shepstone, J. Rogers, J. R. Kirwan) The distribution of distal femoral osteophytes in a human skeletal population. *Annals of the Rheumatic Diseases*, **59**, 513–520. (2000).
72. (with J. Warren Beck, David A. Richards, R. Lawrence Edwards, Peter L. Smart, Douglas J. Donahue, Sofia Hererra-Osterheld, George S. Burr, Leal Calsoyas, A. J. Timothy Jull, and Dana Biddulph) Extremely Large Variations of Atmospheric ^{14}C Concentration During the Last Glacial Period. *Science*, **292**, 2453–2458. (2001)
73. (with L. Shepstone, J. Rogers, J. R. Kirwan) The shape of the intercondylar notch of the human femur: a comparison of osteoarthritic and non-osteoarthritic bones from a skeletal sample. *Annals of the Rheumatic Diseases*, **60**, 968–973. (2001).
74. (with T. T. Cai) Incorporating information on neighboring coefficients into wavelet estimation. *Sankhya Series B*, **63**, 127–148. (2001).
75. (with T. R. Downie) A wavelet mixture approach to the estimation of image deformation functions. *Sankhya Series B*, **63**, 181–198. (2001).
76. (with D. R. M. Herrick and G. P. Nason) Some new methods for wavelet density estimation. *Sankhya Series A*, **63**, 394–411. (2001).
77. (with S. Barber and G. P. Nason) Posterior probability intervals for wavelet thresholding. *J. Royal Statist. Soc. Ser. B.*, **64**, 189–205. (2002).
78. (with I. M. Johnstone) Boundary coiflets for wavelet shrinkage in function estimation. *J. Appl. Prob.*, **41A**, 81–98. (2004).
79. (with I. M. Johnstone) Needles and straw in haystacks: Empirical Bayes estimates of possibly sparse sequences. *Ann. Statist.*, **32**, 1594–1649. (2004).
80. (with G. M. James) Functional adaptive model estimation. *J. Amer. Statist. Assoc.*, **100**, 565–576. (2005).
81. (with I. M. Johnstone) EbayesThresh: R programs for Empirical Bayes thresholding. *Journal of Statistical Software*, **12.8**, 1–38 and software package. (2005).
82. (with I. M. Johnstone) Empirical Bayes selection of wavelet thresholds. *Ann. Statist.*, **33**, 1700–1752. (2005).
83. (with T. Bell, J. A. Newman, S. L. Turner and A. K. Lilley.) The contribution of species richness and composition to bacterial services. *Nature*, **436**, 1157–1160. (2005).
84. (with C. Spencer, P. Deloukas, S. Hunt, J. Mullikin, S. Myers, P. Donnelly, D. Bentley and G. McVean.) The influence of recombination on human genetic diversity. *PLoS Genetics*, **2(9)**, e148. (2006).
85. Empirical Bayes thresholding: adapting to sparsity when it advantageous to do so. *Journal of the Korean Statistical Society*, **36**, 1–29. (2007).
86. (with T. J. Heaton) A wavelet/lifting scheme based imputation method. *Journal of the Royal Statistical Society, Series B.*, **70**, 567–587. (2008).
87. (with M. Jansen and G. P. Nason) Multiscale methods for data on graphs and irregular multidimensional situations. *Journal of the Royal Statistical Society, Series B*, **71**, 97–125. (2009).

88. (with J. K. Bizley, K. M. M. Walker, A. J. King and J. W. H. Schnupp.) Interdependent encoding of pitch, timbre and location cues in auditory cortex. *Journal of Neuroscience*, **29**, 2064–2075. (2009).
89. Bibliometrics in the Context of the UK Research Assessment Exercise. *Statistical Science* **24**, 15–16. (2009).
90. (with Leen Slaets and Gerda Claeskens) A Multiresolution approach to time warping achieved by a Bayesian prior-posterior transfer fitting strategy. *Journal of the Royal Statistical Society, Series B*, **72**, 673–694. (2010).
91. Crime Statistics: How thoughtful statistics can guide policy. *Journal of the Foundation for Science and Technology* **21(5)**, 4–5. (2011).
92. (with George Nicholson, 24 other authors, and the MolPage consortium) Human metabolic profiles are stably controlled by genetic and environmental variation. *Molecular Systems Biology*, **7**: 525, 1–12. (2011).
93. (with Leen Slaets and Gerda Claeskens) Warping functional data in R and C via a Bayesian multiresolution approach. *Journal of Statistical Software* **55.3**, 1–22 and software package. (2013).

Other publications and public outputs

94. (with P. Bloomfield and others). Volume and area of oilfields and their impact on order of discovery. Report for U.S. Department of Energy, Princeton University, U.S.A. (1979).
95. (with L.S. Mayer and others). Modelling the rates of domestic crude oil discovery and production. Report for U.S. Department of Energy, Princeton University, U.S.A. (1979).
96. (with K.S. Deffeyes). Hotspot tracks and the thermal maturation of hydrocarbons. Report for U.S. Department of Energy, Princeton University, U.S.A. (1979).
97. Comment on a paper by Good and Gaskins. *J. Amer. Statist. Assoc.*, **75**, 67–68. (1980).
98. Density estimation: Are theoretical results useful in practice? *Asymptotic Theory of Statistical Tests and Estimation*. (ed I.M. Chakravarti). Academic Press, New York, 179–203. (1980).
99. Density estimation for univariate and bivariate data. *Interpreting Multivariate Data* (ed. V. Barnett), Wiley, Chichester, 1981, 37–53.
100. On a paper by D.V. Lindley. *Int. Stat. Rev.*, **50**, 19–20. (1982).
101. A bootstrap approach to bump hunting. *Proc. NASA Conf. on density estimation and function smoothing*. (ed. L.F. Guseman, Jr.). 195–213. (1982).
102. Some properties of a test for multimodality based on kernel density estimates. *Probability, Statistics and Analysis*, (ed. J.F.C. Kingman and G.E.H. Reuter). Cambridge University Press, Cambridge, 248–259. (1983).
103. Some remarks on roughness penalty density estimates. *Colloquia Mathematica Societas Janos Bolyai*, **36**, Limit Theorems of Probability Theory (ed. P. Revesz), pub. North-Holland, 957–979. (1984).
104. Poisson limit theory for U-statistics, some applications and a counter-example. *Stochastic Geometry and Stereology* (W. Weil and K.V. Ambartzumian, eds.), Teubner-Verlag, 170–178, (1984).

105. Penalized maximum likelihood estimation. *Encyclopedia of Statistical Sciences*, volume 6, (S. Kotz and N.L. Johnson eds.), Wiley, New York, 664–667. (1984).
106. The interplay between cross-validation and smoothing methods. *Proceedings of the First World Congress of the Bernoulli Society* (Yu. V. Prohorov and V. V. Sazonov, editors), Utrecht, VNU Science Press, volume 2, pp. 87–94. (1987).
107. Should we use kernel methods at all? *Statistical Science*, **6**, 430–433. (1991).
108. (with C. Jennison). How to charge for boundaries in a pixel image. *The Art of Statistical Science: A tribute to G. S. Watson*. (ed K.V. Mardia). Wiley, New York, pp. 209–230. (1992).
109. Function estimation and functional data analysis. *First European Congress of Mathematics*. (ed A. Joseph, F. Mignot, F. Murat, B. Prum and R. Rentschler). Birkhäuser Verlag, Basel, vol II, pp 407–427. (1994).
110. (with G. P. Nason) The stationary wavelet transform and some statistical applications. *Wavelets and Statistics* (A. Antoniadis and G. Oppenheim, eds.), Lecture Notes in Statistics 103, Springer-Verlag, pp 281–300. (1995).
111. (with T. R. Downie and L. Shepstone) A wavelet based approach to deformable templates. In *Proceedings in Image Fusion and Shape Variability Techniques* (eds K. V. Mardia, C. A. Gill and I. L. Dryden), Leeds: Leeds University Press, pp. 163–169. (1996).
112. Wavelets in statistics: some recent developments. In Payne R. and Green P. (eds) *Compstat: Proceedings in Computational Statistics 1998*. Heidelberg: Physica-Verlag, pp 15–26.
113. (with J. Rogers and L. Shepstone). *Old Bones and New Medicine*. Exhibit for Royal Society *New Frontiers in Science Exhibition*, 1999.
114. (with G. P. Nason) Wavelets for regression and other statistical problems. In *Smoothing and Regression: Approaches, Computation and Application* (ed. M. G. Schimek), New York: Wiley, pp 159–191. (2000).
115. (with J. O. Ramsay) Functional Data Analysis. *International Encyclopedia of the Social and Behavioral Sciences* N. J. Smelser and P. B. Baltes (editors). Elsevier. (2001).
116. (with M. Jansen and G. P. Nason) Scattered data smoothing by empirical Bayesian shrinkage of second generation wavelet coefficients, in M. Unser and A. Aldroubi, Editors, *Wavelet Applications in Signal and Image Processing IX*, Proceedings of SPIE Vol. 4478, pp 87–97. (2001).
117. EbayesThresh: Empirical Bayes thresholding and related methods. R package, version 1.3.0.¹³ (Original version 2002/3; this version 2005).
118. (with A. Antoniadis, M. Jansen and I. M. Johnstone) EbayesThresh: MATLAB™ software for Empirical Bayes thresholding. (2004).
119. (with G. K. Ambler) Perfect simulation of spatial point processes using dominated coupling from the past, with application to a multiscale area-interaction point process. (2004).
120. (with G. K. Ambler) Perfect simulation for wavelet thresholding with correlated coefficients. (2004).
121. (with G. K. Ambler) Perfect simulation using dominated coupling from the past with application to area-interaction point processes and wavelet thresholding. *Probability*

¹³ available from <http://cran.r-project.org>

and Mathematical Genetics: Papers in Honour of Sir John Kingman (Editors N.H. Bingham and C.M. Goldie), London Mathematical Society Lecture Notes Series **378**, Cambridge University Press, pp 64–90. (2010).