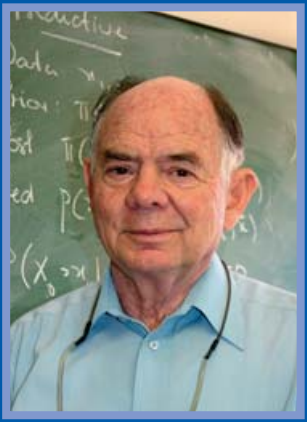


Prof. Daan de Waal

Department of *Mathematical Statistics*

Overview

Due to a general interest in the commercial and actuarial/financial risk programmes offered by the UFS, the year 2007 was characterised by a growing enthusiasm among students in Statistics and Mathematical Statistics and Actuarial Science.

More than 3 000 students were served by the Department of Mathematical Statistics during the year, of which 30 were postgraduate students. The department presented 61 courses and 11 Ph.D. students were supervised. Two of these students, Dr Vince Micali from Eskom and Ms Andréhette Nel, a lecturer in the department, completed their studies in 2007. In the Actuarial programme Mr Von Maltitz achieved great success by securing a 90% pass rate.

Prof. Max Finkelstein's research on survival analysis is a major research output in the department. A textbook on his research will be published in the near future. Other research, focusing on the mixed linear model and Bayesian posterior constructions of certain parametric functions, was initiated by Prof. Abrie van der Merwe. Profs Finkelstein and Van der Merwe retained a National Research Foundation's (NRF) evaluation of C1 and B3 respectively.

The research by Prof. Daan de Waal on extreme value analysis resulted in two Ph.D.s being completed in 2007. The interest in the area of data mining by Dr Isabelle Garisch is proceeding well. She presented a paper at an international conference on Artificial Intelligence and Pattern Recognition in Orlando, United States of America (USA), as well as a course on Data Mining at Long Beach, California in the USA.

Other staff members who attended conferences and conducted research visits abroad were Profs De Waal, Van der Merwe, Finkelstein, and Mr Kobus Bekker. Mr Bekker visited his promoter, Prof. Jan Dhaene, a visiting professor of the department, at the Katholieke Universiteit Leuven, Belgium for a month to do research for his Ph.D. in Actuarial Science.

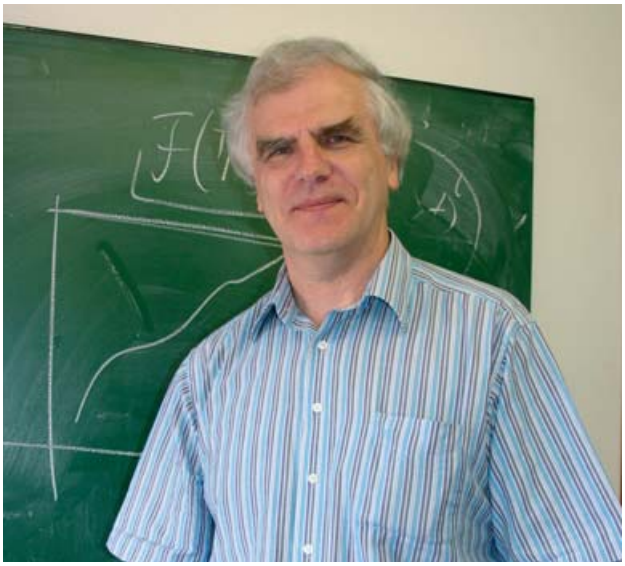
The Eskom project on the forecasting of availability of water in the upper Orange River for the generation of hydro power at the Gariep and Van der Kloof dams is ongoing and regular forecasts are made by Mr Sean van der Merwe.

The department presented weekly seminars on research by staff, postgraduates, and visitors. Two visitors from abroad, namely Profs Jan Dhaene and Marc Goovaerts from the Katholieke Universiteit Leuven, as well as Dr Vince Micali from Eskom made presentations.

Dr Nel, Messrs Bekker, Michael von Maltitz and Van der Merwe attended the Short Programme on Assessment of Learning in Higher Education (SPALHE) at the UFS.

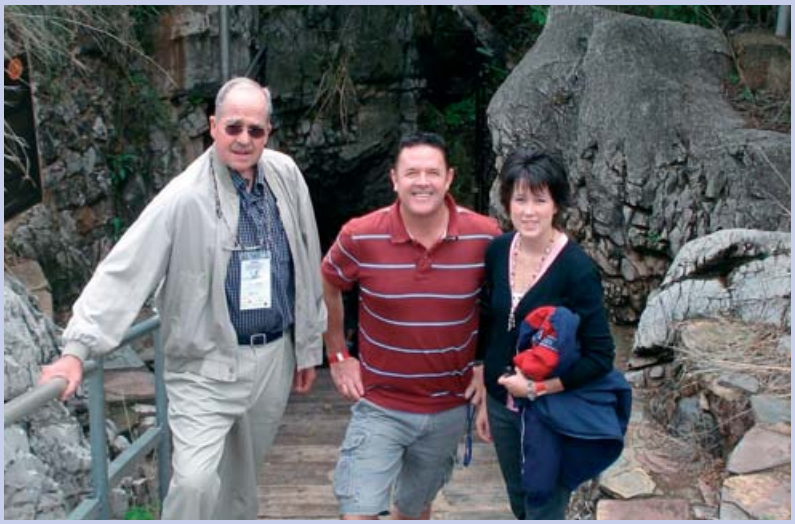
Two staff members have been promoted, namely Prof. Finkelstein to Senior Professor in June 2006, and Ms Linda van der Merwe to Senior Lecture as from 2008. Dr Robert Schall, a director at Quintiles, was appointed Professor in the department on a part time basis with the opportunity to become a full time staff member from 1 October 2008.

Two staff members, namely Profs Van der Merwe and De Waal, retired in 2006 and were appointed on a contract basis. Prof. Kobus de Wet retired in 2007 after 15 years of service and Ms Ella Hayes, Administrative Officer, also retired the same year. Both have been appointed on a contract basis for 2008.



Prof. Max Finkelstein of the department was awarded the Sichel Medal by the South African Statistical Association for the best publication of 2006.

PPS Insurance awarded a bursary to the value of R30 000 to Mr Michael Hill, an honours student in Actuarial Science. The bursary recognises overall excellence by tertiary students in South Africa and is awarded only once a year to a deserving student. Attending the award ceremony are, from the left: Mr Kobus Bekker, Programme Director of Actuarial Science at the department, Mr Barry Pretorius, Area Sales Manager of PPS Insurance, Mr Hill, and Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS.



From left are: Prof. Kobus de Wet, of the department, Mr Chris Muller, University of Stellenbosch, and Ms Andréhette Nel, Lecturer at the department, during the conference of the South African Statistical Association. The photo was taken at the Sterkfontein Caves.

Staff

Professors: Profs Daan de Waal, Kobus de Wet, Max Finkelstein, Abrie van der Merwe, Robert Schall

Senior Lecturers: Drs Isabelle Garisch, Martin van Zyl

Lecturers: Drs Carin Lombaard, Inet Kemp, Mss Linda van der Merwe, Andréhette Nel, Messrs Delson Chikobvu, Dries Naudé, Kobus Bekker, Michael von Maltitz, Sean van der Merwe

Part Time Lecturers: Dr Cay van der Merwe, Mss Maryn Brüssow, Lizanne Raubenheimer, Walina Oosthuizen, Elizabeth Girmay, Mr Frans Koning

Secretary: Ms Elize Mathee

Assistant Officer: Ms Ella Hayes
Messenger: Mr William Baranye

Contact details

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Research outputs

Research articles

De Waal, D.J., Van Gelder, P.H.A.J.M. & Nel, A. 2007. Estimating joint tail probabilities of river discharges through the Logistic Copula. *Environmetrics* 18: 621-631.

Finkelstein, M.S. 2007. Aging: Damage accumulation versus increasing mortality rate. *Mathematical Biosciences* 207: 104-112.

Finkelstein, M.S. 2007. Imperfect repair and lifesaving in heterogeneous populations. *Reliability Engineering and System Safety* 12: 1671-1676.

Finkelstein, M.S. 2007. On some ageing properties of general repair processes. *Journal of Applied Probability* 44: 506-513.

Finkelstein, M.S. 2007. On statistical and information based virtual age of degrading systems. *Reliability Engineering and System Safety* 92: 676-682.

Finkelstein, M.S. 2007. Shocks in homogeneous and heterogeneous populations. *Reliability Engineering and System Safety* 92: 569-575.

Finkelstein, M.S. & Esaulova, V. 2007. Bounds for the failure rate in heterogeneous populations. *South African Statistical Journal* 41: 23-39.

Van der Merwe, A.J. & Bekker, K.N. 2007. A computational Bayesian approached to the balanced Bühlmann Credibility Model. *South-African Statistical Magazine* 40(2): 65-103.

Van der Merwe, A.J. & Hugo, J. 2007. Bayesian tolerance intervals for the balanced Two-Factor Nested Random Effects Model. *Test* 16(3): 598-612.

Chapters in books

Finkelstein, M.S. 2007. Virtual age versus chronological age. In *Statistical Models and Methods for Biomedical and Technical Systems*, edited by F. Vonta, M. Nikulin, N. Limnious & C. Huber-Carol. Boston: Birkhäuser. pp. 69-82.

Reports

Bezuidenhout, E., Schall, R. & Karelsen, G. 2007. *Accuracy and precision of AUC and AUC as characteristics of relative biovailability in bioequivalence studies.* Report nr. 372 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Bezuidenhout, M. & Schall, R. 2007. *The empricial coverage of student's -confidence interval.* Report nr. 376 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Chikobvu, D. & Van der Merwe, A.J. 2007. *A Bayesian simulation solution to the supplier selection problem using capability indices.* Report nr. 374 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Chikobvu, D. & Van der Merwe, A.J. 2007. *A process capability index for averages of observations from new batches in the case of the balanced random effects model.* Report nr. 378 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

De Waal, D.J. 2007. *Applying the Dirichlet mixture as the spectral distribution on modelling multivariate extremes.* Report nr. 371 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

De Waal, D.J. 2007. *Considering tail probabilities on multivariate extremes using the spectral density.* Report nr. 375 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Jandrell, N. & Van der Merwe, A.J. 2007. *Tolerance intervals using Bayesian simulation.* Report nr. 373 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Lowings, J. & Garisch, I. 2007. *Bayesian networks versus decision trees.* Report nr. 369 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Mr Wim Els, Executive Director of the Actuarial Society of South Africa (ASSA) and former student of the UFS, presented a talk on a proposed new examination system South African actuarial students will need to follow from 2010 in order to qualify as actuaries. The new examination system will be fully managed by the local actuarial profession and will still have international recognition and high professional standards at its core. The UFS has an exemption agreement under the current examination system for the professional subjects CT1 to CT8 (first level) with the Faculty and Institute of Actuaries in the United Kingdom. Attending the talk are, from the left: Mr Kobus Bekker, Programme Director of Actuarial Science at the department, Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS, and Mr Els.

Raubenheimer, L. & Van der Merwe, A.J. 2007. *Bayesian estimation of functions of poisson and binomial rates with applications to reliability.* Report nr. 377 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Van der Merwe, S. 2007. *Improved reporting of classification error rates – The Dodgy finder.* Report nr. 370 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Von Maltitz, M.J. & Van der Merwe, A.J. 2007. *An application of sequential regression multiple imputation on panel data.* Report nr. 379 to the Department of Mathematical Statistics, University of the Free State, Bloemfontein, South Africa.

Conference contributions

Chikobvu, D. & Van der Merwe, A.J. 2007. *A bayesian simulation solution to the supplier selection problem using capability indices.* Paper presented at the 50th Annual Conference of the South African Statistical Association, Misty Hills, Muldersdrift, Johannesburg, South Africa. 29 October - 2 November.

De Waal, D.J. & Nel, A. 2007. *The spectral distribution in terms of a mixture of Dirichlet's for modelling multivariate extremes.* Oral presentation at the 50th Annual Conference of the South African Statistical Association, Misty Hills, Muldersdrift, Johannesburg, South Africa. 29 October - 2 November.

Finkelstein, M.S. 2007. *On stochastic models of biological aging.* Paper presented at the 6th European Gerontology Congress, St. Petersburg, Russia. 5-8 July.

Finkelstein, M.S. 2007. *On the competing risks model with trailty parameter.* Paper presented at the Mathematical Methods in Reliability Conference, Glasgow, England. 1-4 July.

Garisch, I. 2007. *Calculating the probability of consensus decision-making using expert information.* Paper presented at the International Conference on Artificial Intelligence and Pattern Recognition, Orlando, USA. 7-22 July.

Garisch, I. & Groenewald, P.C.N. 2007. *Calculating the probability of consensus decision-making using expert information.* Proceedings of the International Conference on Artificial Intelligence and Pattern Recognition, Orlando, Florida, USA. 7-22 July. pp. 82-87.

Van der Merwe, A.J. & Brussow, M. 2007. *Bayesian calibration using more than one experiment for polynomial regression.* Poster presented at the 6th Workshop on Objective Bayesian Analysis, Università de Roma Sapienza, Rome, Italy. 8-12 June.

Van der Merwe, S. & Van der Merwe, C.A. 2007. *Student success: Data mining measures what matters.* Oral presentation delivered at the European Association of Institute Research Conference, Insbruck, Austria. 26-29 August.

Von Maltitz, M.J. 2007. *An application of sequential regression multiple imputation (SRMI) on panel data.* Oral presentation delivered at the 50th Annual Conference of the South African Statistical Association, Misty Hills, Muldersdrift, Johannesburg, South Africa. 29 October - 2 November.