

DEPARTMENT OF STATISTICS

ANNUAL REPORT 2005

Highlights

The paper by the Department's Ross Ihaka and Robert Gentleman introducing the statistical software system R has become the most cited paper in statistics, and we believe in all the mathematical sciences, of the last 10 years.

Marti Anderson and Rich Ford gained \$500,000 in new Auckland Regional Council research contracts for ecosystems projects, predominantly estuary monitoring, and another substantial grant from the VC's University Development Fund. James Curran obtained a 3-year \$176,000 contract from the Forensic Science Service of the UK.

In April, the International Association for Survey Sampling held a conference in Auckland in honour of Alastair Scott called "Complex sampling, retrospective sampling and missing data" which drew many of the most eminent international figures in these fields.

Ilze Ziedins won a 2005 Dean of Science Teaching Excellence Award following Rachel Fewster's 2004 Award. The Department led an educational enrichment and outreach initiative called CensusAtSchool 2005. This was partially supported by an \$80,000 contract from Statistics New Zealand and the Ministry of Education. The project attracted significant TV and print-media coverage. The data-gathering survey phase had over 33,000 student-participants at Year 5-10 level from over 700 schools. The teaching resources developed according to the principles and vision of Maxine Pfannkuch, have been lauded by the Royal Statistical Society's Centre for Statistical Education. This is one of three closely intertwined initiatives to promote teaching and learning in schools that we have progressed this year. The other two are curriculum review and development, and teacher workshops.

Background

The Department of Statistics is the largest in New Zealand and, as far as we can ascertain, Australia. In 2005 there were approximately 40 full-time-equivalent academic staff, including 20-fte staff with contracts that involve research, and 5-fte general staff. The Department taught 947 equivalent full-time students (efTs) in 2005. We have been fortunate in not only avoiding the contraction that has afflicted the Statistics discipline in other Australasian universities, but actually prospering. Our good health and growth has been largely due to gaining and retaining most of the service teaching of statistics within the University. The Department has a sizable presence at the Tamaki Campus with 9 full-time academic staff including 3 of our 7 staff-members at Associate Professor and above. There were also 6 PhD students.

I DEVELOPMENTS IN TEACHING

The highlights of the year were the announcements in early 2005 that Rachel Fewster had won a 2004 Dean of Science Teaching Excellence Award, and in December that Ilze Ziedins won a 2005 Dean of Science Teaching Excellence Award.

A pilot study into the use of instant messaging as a help-support service was conducted by Rachel Cunliffe in two Stage 1 statistics courses with a combined enrolment of 450 students. Preliminary results were presented at the International Association for Statistical Education's conference on "Statistics Education and the Communication of Statistics" in Sydney. Because of the great interest this raised, Rachel was invited to present the findings at the next International Conference on the Teaching of Statistics (held every 4 years). Mike Forster's talk on Teaching Students to Write about Statistics (about Stage 2 applied statistics) further established the innovative nature of developments at Auckland and was likewise very warmly received at the IASE conference. The instant messaging work was partly supported by a Teaching Improvement Grant. During the course of another Teaching Improvement Grant, the Departments of Statistics and the Department of Psychology collaborated on the way in which statistical ideas were approached at Stage 1 in the two departments so that major statistical messages were aligned and reinforced. On the statistics side this was led by Matt Regan.

A great deal of course development went on in 2005 gearing up for the 2006 academic year including for two wholly new Stage 3 courses in applied time series analysis and statistical programming and the expansion of half-courses in experimental design and sample surveys to whole courses, and a rethinking of the Stats 10x series teaching model followed by the consequent rewriting of the enormously comprehensive teaching resources for those courses, including the narrated electronic lectures.

Following the example of Computer Science, electronic forums have now been established for all undergraduate courses. This sort of communication seems valuable and successful for large classes whereas for smaller ones, with one or two exceptions, there is often very little activity on the forums (as one might expect). Without a critical mass of activity they lie dormant.

Enrolment Patterns

Statistics became the 3rd largest Department in the Faculty of Science in Efts terms in 2004 (after the School of Biological Sciences and Computer Science) and remained so in 2005. The numbers in courses in 2005 were very similar to 2004. The only change of any note is a drop in international students from 25% to 22%, mainly from changes in Stage 1 and 2. A drop in Efts of about 5% has been forecast for 2006 as a result of restructuring. Note that the International/Domestic splits for 2003 and 2004 are based on August projections of end-of-year figures.

TOTAL Efts

Level	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	352	347	365	310	371	421	418	527	516
2	201	205	210	184	161	187	222	248	242
3	94	106	101	106	102	97	116	112	119
Grad	29	30	47	48	42	53	66	61	69
Total	679	690	723	649	675	759	823	947	946

PERCENT INTERNATIONAL Efts

Level	1997	1998	1999	2000	2001	2002	2003	2004	2005
1				8%	16%	25%	24%	24%	19%
2				7%	10%	17%	27%	30%	26%
3				5%	5%	9%	16%	26%	30%
Grad				10%	9%	11%	18%	15%	19%
Of Total				7%	13%	20%	23%	25%	22%

INTERNATIONAL Efts

Level	1997	1998	1999	2000	2001	2002	2003	2004	2005
1				24	59	103	99	124	98
2				13	16	31	59	75	62
3				5	5	9	19	29	36
Grad				5	4	6	12	9	13
Total				47	85	149	190	236	209

DOMESTIC Efts

Level	1997	1998	1999	2000	2001	2002	2003	2004	2005
1				286	312	318	322	403	418
2				171	144	157	164	173	180
3				101	96	88	97	83	83
Grad				44	38	47	55	52	56
Total				602	591	610	638	711	737

II OTHER STUDENT MATTERS

Staff-Student Liaison Committee

Joss Cumming continued her successful running of this committee in 2005. Four meetings were held with good participation from staff and students. The atmosphere at all of these meetings was extremely positive and they have been very valuable as a means of identifying problems students encounter so that they can be solved, and increasing staff understanding of student attitudes and concerns.

Scholarships and Prizes

<i>Senior Scholarship in Statistics:</i>	Chen, Yi Zheng
<i>Annual Prizes in Statistics:</i>	Fu, Dan Weldon, Mark
<i>Statistics New Zealand Prize:</i>	Yang, Tao
<i>NZ Aluminium Smelters Prize:</i>	Thomas, Jessica Maree Yu, Zeming
<i>Senior Prizes:</i>	Choo, Chit Hock Holl, Shannon Claire Hong, Seong Yun Gopal, Sharlin Li, Dan Tran, Hai Quy You, Jin Rui Cowie, Paul Geoffrey Cheng, Ting Cheng, Yu-Chun Danny Lam, Yi Mang Yvonne Zhang, Shu Zhang, Tao Zhang, Yu Pou, Jamie Rewi Li, Jie Ping Zhao, Lingyan Woo, Herbert Shu On Luen, Melanie Anne Sun, Huiying

Summer Studentships

Faculty of Science Summer Scholarships were offered to the following (almost all of whom accepted):

Richard Ball	Studying invasive rats and other mammals on New Zealand offshore islands.
Ting Chen	Associations between micro albumin urea and cardiovascular risk factors
Yi Zheng Chen	Congestion pricing for optimality in stochastic networks
Chit Hock Choo	To develop gene-based predictors of colon cancer relapse, facilitating individualised patient risk assessment and thus personalised treatment
Paul Cowie	Political polls: A statistical case study.
Audrey Baoyi Feng	A comparison of methods for linkage disequilibrium gene mapping with dense genetic marker data.
Seong Yun Hong	Quality-control testing procedures for statical graphics software.
Yi Mang Yvonne Lam	Analysis of non-regular fold-over fractional factorial designs.
Dan Li	ANOVA using functional responses.
Melanie Anne Luen	Functions for distributions related to the hyperbolic distribution.
Brendan McArdle	Three dimensional visualisation extensions for R
Helen Shearman	Genetic-based analysis of rat movements between islands in NZ.
Jennifer Wilcock	Asymptotic relative efficiency of two-stage case-control designs
Huaning Yang	Genomic proximity as an indicator of similarity in expression
Tao Yang	Hierarchical Aitken Acceleration of the EM algorithm.
Jinrui You	The performance of the deviance information criterion for model choice
Lup Chi (Jonathan) Yu	Accuracy of numerical calculation of distribution and quantile functions
Tao Zhang	Hierarchical Aitken Acceleration of the EM algorithm.
Yu Zhang	Developing a SAS macro for analysis of multivariate ecological community data.
Lingyan Zhao	How synthetic data sets can be generated by application of advanced statistical modelling to mimic existing confidential data

III EQUAL OPPORTUNITIES

We are very conscious of EEO issues in appointments and promotions processes. We make every attempt to accommodate the needs of those with heavy family responsibilities. Dr Wiremu Solomon Science represents the Department on the Faculty of Science EO Committee and Dr Marti Anderson is Departmental liaison with Women in Science and Engineering.

Maori and Pasifika Staff

We have 3 FTE Maori teaching staff in the Department. Dr Ross Ihaka is a Senior Lecturer, Dr Wiremu Solomon is a Lecturer who has a joint appointment with Mathematics, Rachel Cunliffe is a Senior Tutor and Susan Wingfield is a half-time Tutor working in the Maori/ Pasifika Rooms. Also staffing the Maori/ Pasifika Rooms are Senior Tutors, Garry Nathan and Viliami Latu (of Tongan origin) who have joint appointments with Mathematics. We also have a 20% FTE Maori Research Fellow.

Staff Gender Equity

Of the 28 equivalent full time positions at lecturer/senior tutor level or above, women comprise 9 FTEs, or approximately 32%, up from 25% in 2005. Although no woman is yet above the Senior Lecturer rank progress is being made. Currently 3 women are above the SL bar.

EEdO

Wiremu Solomon had primary EEdO responsibilities for the Department.

The Department does not have any significant problems with gender equity among students. We are at gender parity at all levels except PhD where a third of students are female.

The student population is approximately 50% Asian and the Department does have large numbers of students for whom English is not their first language. The narrated lecture CDs for the Stats 10x and the Stats 20x courses are in part a response to this problem. At Stage 2 we continue to teach structured forms of writing about the messages in data, partly to overcome language difficulties, but more importantly to help students organise their thoughts. The composition of our complement of student-tutors and demonstrators now largely reflects the diverse set of ethnic and language backgrounds of the students they are helping.

The Department continues to cooperate with the Student Learning Centre to provide foundation and supplementary workshops for students who are under prepared for first-year study. The coordination was much better in 2005 with Leila Boyle, who has taught on the Stage 1 team, now in the role at SLC.

Special efforts being made to help Maori and Pasifika students are described in the next section.

IV TREATY OF WAITANGI

Dr Ross Ihaka serves on the Science Maori Responsiveness Committee and Susan Wingfield serves on the Maori and Pasifika in Science Committee.

Over recent years, the Department has worked in partnership with the Department of Mathematics as originators of the Tuakana (peer mentoring) Programme concept that has now been adopted quite widely across the university. This and targeted tutorials and workshops at first-year level run through our Maori and Pasifika rooms continue to be our main focus in this area. The Maori and Pasifika operations of the two Departments work together so seamlessly that they are almost a single operation. The distinctions are even more blurred by the fact that many of the staff involved hold or have held joint appointments. There are 2 moderately large study rooms for Maori and Pasifika students. Several computers and facilities to facilitate social networking are provided. The rooms are adjacent to the offices of the Maori and Pasifika Tutors. Students are contacted personally by phone and invited to participate. Despite these efforts and the demonstrated benefits of participation, however, there are problems in raising levels of regular participation by Maori and Pasifika students high enough to have a significant impact on problems such as lower pass rates.

We have continued with a slight adaptation of the successful Mathematics Department concept of Aldis Scholarships and given 5 scholarships to students who had just completed high school and enrolled in STATS 108 at Summer School. These scholarships also give a sharp focus to school visits.

V RESEARCH

The Department has 20 staff with research expectations in their contracts.

Highlights

The paper by the Department's Ross Ihaka and Robert Gentleman introducing the statistical software system R has become the most cited paper in statistics, and we believe in all the mathematical sciences, of the last 10 years. To date there are more than 20 books on R or some field of statistics and R with at least another 10 in the pipeline. One of these books, entitled "*R Graphics*" published by Chapman and Hall, is by statistics staff member Paul Murrell, who is also graphical principal of the R Project.

Once again there has been growth in research productivity. There was a 14% increase in the number of refereed articles for 2005 over 2004 following a 20% increase for 2004 over 2003, a 40% increase of 2003 over 2002, which in turn showed a marked improvement over 2001. The 21 editorial roles for international journals held by Statistics staff is a clear mark of international regard.

Marti Anderson and Rich Ford gained \$500,000 in new Auckland Regional Council research contracts for ecosystems projects, predominantly estuary monitoring, and another substantial grant from the VC's University Development Fund. James Curran obtained a 3-year \$176,000 contract from the Forensic Science Service of the UK.

A paper on "Intercepting the first rat ashore", written by PhD student James Russell with others from the Rodent Invasion Project Research Group (D. R. Towns, S. H. Anderson & M. N. Clout) was published in *Nature* and attracted attention around the world. The story was run by over 100 international news agencies, from the UK Independent to Washington National Public Radio, and it also included a feature on NZ TV news.

In April, the International Association for Survey Sampling held a conference in Auckland in honour of Alastair Scott called "Complex sampling, retrospective sampling and missing data" which drew many of the most eminent international figures in these fields. In November, Alastair Scott was invited to Washington DC to be a Joint Program in Survey Methodology Distinguished Lecturer and to give a week-long invited workshops on sampling to the Washington Statistical Society in DC and a shorter version to Statistics New Zealand. George Seber gave a Keynote Lecture and Alan Lee & Alastair Scott gave invited papers at the 14th International Workshop on Matrices and Statistics held this year at Massey Albany. Maxine Pfannkuch organised the 4th Statistical Reasoning, Thinking and Literacy Forum, in Auckland – a first for New Zealand. This was a week-long invitation-only, residential, workshop-conference that drew most of the biggest international names in the area.

General

Research in the Department is notable for the interactions with other departments and research groups. There are strong connections with the Department of Community Health, the Clinical Trials Research Unit (both now constituents of the School of Population Health), the New Zealand Quality of Healthcare Study, the Department of Engineering Science, ESR, the Forest Research Institute, Crop and Food Research, the Department of Mathematics, the School of Biological Science, and the School of Geography and Environmental Science. Typical links include joint appointments, shared research grants, shared supervision of postgraduate students, and the writing of joint papers.

Members of the Department are working in the areas of statistical computing, sample surveys, experimental design, statistical ecology, statistical genetics, Bayesian statistics, medical statistics, applied probability and stochastic operations research, statistics in fisheries, forensic science, and statistics education.

A major ongoing strength is the statistical computing software R. The R statistical system has not only become widely used internationally for its comprehensive built-in capabilities for data analysis, but it is also now the usual platform of choice whenever researchers are programming innovative statistical solutions. R was initially developed by the Department's Ross Ihaka and Robert Gentleman in 1992. Since 1997 it has become a burgeoning international collaboration involving most of the world's foremost specialists in statistical computing including the Department's Paul Murrell. R is included in all major distributions of the Linux software.

PUBLICATIONS

Book - Authored

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Book - Chapter

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MURRELL, P.R. 'Chi-square Test, Likert Scales, R, Visual Analogue Scale, Yates' Correction', In:B. S. Everitt and C. Palmer(ed.), *Encyclopaedic Companion to Medical Statistics* ., London, Arnold Hodder Headline PLC/Oxford University Press, p.52-371, 2005

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Book - Edited

BUCKLETON, J. S., CURRAN, J.M. *Weight-of-Evidence for Forensic DNA Profiles*, by David J. Balding, Oxford, Oxford University Press, p1-3, 2005

Conference Contribution - Abstract

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Conference Contribution - Oral Presentation

FEIGIN, V., MOYES, S.A., FENG, H., VANDER HOORN, S., SCOTT, D.J., MEYER, R., BONITA, R. 'Can Weather Change Trigger Stroke? A population-based study in Auckland, New Zealand 1991-1992', *14th European Stroke Conference, Bologna, Italy, 25-28 May, 2005*

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CUNLIFFE, R.V. 'The New Zealand Experience with CensusAtSchool', *ISI 55, Sydney, 7-12 April, 2005*

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Conference Contribution - Paper Published on Proceedings

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MARCHANT, T., NICKERSON, A., SCOTT, D.J., TAYLOR, S.W. 'Development of empirical relationships for the metallurgical design of hot-rolled steel', *MISG 2005*, Graeme Wake(ed.), *Proceedings of the Mathematics-In-Industry Study Group 2005, Massey University, Albany, February 2005, 2005, p.55-70*

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Journal - Commentary/letter

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Journal - Research Article

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WRIGHT, P.J., TRIGGS, C.M. 'Control of bacterial soft rot of calla (*Zantedeschia* spp.) by pathogen exclusion, elimination and removal', *New Zealand Journal of Crop and Horticultural Science.*, 33, (2), p117-123, 2005

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Software

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Review

YEE, T.W. 'Book Review of Julian J. Faraway: Linear Models with R, Chapman & Hall/CRC.', *Review in R Newsletter*, 5, (1), 56-57, 2005

Commissioned Report

ANDERSON, M.J., STEWART, M.J., FORD, R.B., WILLIAMS, C. 'Long Bay Marine Monitoring Programme Report 2005', Auckland Regional Council, Auckland, New Zealand, 1-97, 2005, Auckland UniServices

FORD, R.B., ANDERSON, M.J. 'Ecological monitoring of the Okura and Whitford estuaries 2004-2005: temporal and spatial extensions of regional models', Auckland Regional Council, Auckland, New Zealand, 1-83, 2005, Auckland UniServices

SCRAGG, R., MAITRA, A. 'Asian Health in Aotearoa: an analysis of the 2002/03 New Zealand Health Survey', The Asian Network Inc, 1-94, 2005

TAYLOR, R.B., ANDERSON, M.J., EGLI, D., USMAR, N.R., WILLIS, T.J. 'Cape Rodney to Okakari Point Marine Reserve fish monitoring 2005: final report', Auckland Conservancy, Department of Conservation, 1-38, 2005, Auckland UniServices

Technical Report

LEWTHWAITE, S.L., TRIGGS, C.M., SCHEFFER, J.J.C. 'Paraquat resistance in black nightshade', *Crop & Food Research Ltd, Confidential Report*, (1419), 2005, 1-31

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SCHEFFER, J.J.C., TRIGGS, C.M. 'Evaluation of the efficacy of the soil reactivator Terralyt Plus in onions and potatoes', *Crop & Food Research Ltd, Confidential Report*, (1346), 2005, 1-7

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MSc by thesis completed

WILLCOX, Ann Roberta Statistical Analysis in Sport: How Do You Win a Netball Game

PhD completed

BERG, Andreas Bayesian analysis of financial time series
 HIROSE, Yuichi Semi parametric efficiency bounds
 MACKENZIE, Monique Non-linear generalized mixed models: a regression spline approach

List of New and Unreported Research Grants

ANDERSON, Marti & R.B. Ford	Auckland Regional Council (Contract Research) \$265,000
ANDERSON, Marti & R.B. Ford	Auckland Regional Council (Contract Research) \$108,400
ANDERSON, Marti, R.B. Ford & J Webster-Brown	VCUDF, \$80,000
ANDERSON, Marti & R.B. Ford	Auckland Regional Council (Contract Research) \$120,000
BLACK, Mik	Associate on HRC \$3,000,000
LEE, Alan	Statistics New Zealand, \$100,000
MILLAR, Russell & J Helu	Arthington Davy Fund \$22,000
WANG, Yong	University of Auckland Research Fund, \$3,500
YEE, Thomas	AURC, \$3800

Student Research

PhD Students

AFIMEIMOUNGA, Heti	Modelling and optimal control of queueing networks
CLOETE, Nicoleen	Markov chain Monte Carlo methods for population genetics models
DONOVAN, Carl	Non linear multivariate methods in ecology
GENTILES, Dudley	Cardiovascular risk factors in Maori people
HELU, Joe	Stock assessment models of South Pacific tuna
LANGLOIS, Tim	Effects of marine reserves and proximity of rocky reefs on soft sediment macro invertebrates
LAW, Derek	New methodologies for three dimensional representations of statistical data
LEE, Arier	Random effect models for ordinal data
LEADER, Debbie	Multivariate Analysis of Bioinformatic Data
MADON, Benedicte	Population size estimation by combining both genotype and photo identification data.
MAITRA, Alokandana	Analysis of survey data. Interviewer effects in sample surveys
MILLER, Steven	Stochastic modelling of a rat invasions among islands in the New Zealand archipelago
PAWLEY, Matt	Geostatistical methods in ecological sampling
REILLY, James	Imputation and data fusion
ROEVER, Christian	Bayesian strategies for astrophysical data analysis
RUSSELL, James	Invasion ecology of rats on NZ islands
SONG, Qui (Sarah)	Development of data mining techniques for microarray data
STEWART, Wayne	Bayesian modeling of fisheries
SU, Ji Zi	Internet traffic: analysis, modeling and control.
SUNBORN-MACDONALD, Gerhard	Cardiovascular disease risk factors in Pacific people
TRAN, Thomas	The Hyperbolic Distribution and its applications
TSO, Jennifer	The Relationship between Stroke Occurrence and Solar, Planetary, and Interplanetary Parameters
UMSTAETTER, Richard	Bayesian strategies for astrophysical data analysis
WALKER, Lyndon	Modelling social change in New Zealand: social simulation applied to a census "test bed"
WELCH, David	Bayesian Estimation of host and FIV genealogies of cat populations in New Zealand.

MSc Thesis

MANNING, Michael	On fitting and comparing selected statistical models of fish growth.
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Postdoctoral Fellow

Dr Richard Ford	Monitoring soft-sediment fauna of estuaries in the Auckland region
Dr Sam Ferreira	A stochastic modelling framework for metapopulation dynamics with conservation applications.

Research Fellows

Andrew Sporle, Stephen McTaggart

Medium-term Visitors to the Department

Dr John Brewster	University of Manitoba, Canada, 1 October 2004 - 31 March 2005
Prof Angelika van der Linde	University of Bremen, Germany, 15 February – 30 March 2005
Prof Simo Putanen	University of Tampere, Finland, 25 March – 15 May 2005
Jarkko Isotalo	University of Tampere, Finland, 28 March – 15 May 2005
Prof John Neuhaus	University of California, San Francisco, USA, 12 April – 12 May 2005
Dr Michael Stuart	Trinity College, Dublin, Ireland, 18 April – 14 June 2005
Prof Brajendra Sutradhar	Memorial University of Newfoundland, Canada, 28 April – 12 May 2005

Invited Conference Papers and Workshops

Marti Anderson	Invited Speaker, closing plenary session, Ecological Society of Australia annual Conference 28 Nov-2 Dec Distinguished Visitor, Women in Science Programme University of New South Wales April 2005 Invited Workshop, Analysing Multi-species responses to complex experimental designs, University of New South Wales, April 2005 Invited 6-day Workshop: Detecting multivariate changes in biological assemblages: experimental design and data analysis, University of Western Australia, July 2005
Andrew Balemi	Invited Workshop to Statistics New Zealand on Lies, Damn Lies and Statistics, Wellington
Rachel Cunliffe	Invited Speaker at International Association for Statistical Education Satellite Conference, Sydney April 2005 Invited Workshop to Statistics New Zealand on Lies, Damn Lies and Statistics, Wellington
James Curran	Invited speaker at the International Forensics Statistics Conference, Arizona, April 2005 Invited workshop participant at ENFSI European Paint and Glass Working Group Workshop, Berlin, Germany (2005). Invited workshop participant at NITECRIME Workshop, Sitges, Spain (2005).
Sam Ferreira	Invited Speaker at Regional Perspective in Wildlife Management, Zimbabwe, Nov 2005
Rachel Fewster	Invited workshop participant at Australian Ornithological Society December 2005
Michael Forster	Invited Speaker at International Association for Statistical Education Satellite Conference, Sydney April 2005
Ross Ihaka	Invited speaker at 55 th Conference of the International Statistical Institute, Sydney, April 2005
Alan Lee	Invited speaker at 14 th International workshop on Matrices and Statistics 29 March-1 April 2005 Invited speaker at IASS 55 in Auckland in April
Brian McArdle	Invited participant at a research meeting (1 week) at the National Center for Ecological Analysis and Synthesis at Santa Barbara.
Russell Millar	Invited speaker at 135 th Annual Meeting of American Fisheries Society, Anchorage, Sept 2005 Invited Visitor to Conservation Technology Unit of New South Wales Fisheries Nov 2005
Arden Miller	Invited speaker at 4 th International conference on business and Industrial Statistics
Geoffrey Prichard	Invited speaker at Equilibrium Models in Wholesale Electricity Markets, Santiago
Alastair Scott	Invited speaker at 14 th International workshop on Matrices and Statistics 29 March-1 April 2005 Invited lecture in the Joint Program in Survey Methodology Distinguished Lecture Series, Washington DC (November) Invited workshop (1 Week) to Washington Statistical Society (November) Invited workshop (3 days) to Statistics New Zealand (October)
George Seber	One of Four Keynote speakers at 14 th International workshop on Matrices and Statistics 29 March-1 April 2005

Chris Triggs	Invited workshop participant at Annual Bioinformatics Meeting, University of Queensland, Brisbane, Australia, April 2005 Invited workshop participant at Nutrigenomics NZ annual meeting, University of Auckland, April 2005
Chris Wild	Keynote speaker for SRTL 4 (venue Auckland) Invited discussant at 55 th Conference of Int. Statistical Institute, Sydney, April 2005 Panel Chair at 55 th Conference of Int. Statistical Institute, Sydney, April 2005 Invited speaker at IASS 55 in Auckland in April
Thomas Yee	Vector generalized linear and additive modelling using R Workshop, prior to the 5th IASC Conference in Hong Kong, 15 December, 2005,
Ilze Ziedins	Organised Invited Sessions for 55 th Conference of International Statistical Institute, Sydney, April 2005 Invited speaker at SPICE (Stats and Prob in Communications Engineering) Workshop, Christchurch, 1 September.

Seminars by Visitors

- 10/3/2005 Professor Angelika van der Linde (University of Bremen, Germany)
Title: General measures of variability and dependence for multivariate continuous distributions
- 23/3/2005 Professor C R Rao (Pennsylvania State University, USA)
Title: Reflections on the past and visions for the future
- 31/3/2005 Dr Peter M.W. Gill (Australian National University)
Title: Efficient calculation of p values in permutation significance tests
- 28/4/2005 Associate Professor Vojislav Kecman (School of Engineering)
Title: Learning from huge data sets by SVM's
- 2/5/2005 Dr. Brajendra Sutradhar (Memorial University of Newfoundland, Canada)
Title: Penalized versus generalised Quasi-likelihood inference in GLMM
- 5/5/2005 Dr. Brajendra Sutradhar (Memorial University of Newfoundland, Canada)
Title: Familial longitudinal data analysis with biomedical applications
- 10/5/2005 Dr Robert King (University of Newcastle, Australia)
Title: Investigating response times using the generalised lambda distribution
- 31/5/2005 Associate Professor Bradford s. Jones (University of Arizona)
Title: Timing and social change: An introduction to event history analysis
- 2/6/2005 Dr S.N. Lahiri (Iowa State University, USA)
Title: On the blocking mechanism for bootstrapping spatial data under a class of stochastic designs
- 9/6/2005 Dr Michael Stuart (Trinity College Dublin)
Title: Mathematical thinking versus statistical thinking; redressing the balance in statistical teaching.
- 21/6/2005 Dr Catherine Loader (Case Western Reserve University, USA)
Title: Statistical inference and tubular neighbourhoods
- 13/6/2003 Dr Mark Clements (National Centre for Epidemiology & Population Health)
Title: Small area analysis of cancer rates
- 11/8/2005 Dr Beatrix Jones (Massey University, New Zealand)
Title: Fitting and interpreting sparse Gaussian graphical models for high dimensional data
- 15/9/2005 Associate Professor David Whitaker (University of Waikato)
Title: The state of art in the generation of efficient statistical designs

13/10/2005 Dr W. Paul Malcolm (Australian National University)
Title: New Gaussian mixture techniques for filtering and smoothing of discrete-time Gauss-Markov jump Markov systems

13/10/2005 Dr Stephane Guindon (Bioinformatics Institute)
Title: Statistics modelling of the natural selection processes acting on protein sequences

10/11/2005 Dr Roger Marshall, (School of Population Health)
Title: Use of scaled rectangular diagrams to visualise categorical data, with particular reference to clinical and epidemiological data

15/12/2005 Dr Peter Clifford (Oxford University)
Title: Exact likelihood calculation for a class of Cox processes

16/12/2005 Dr Peter Clifford (Oxford University)
Title: On-line inference from data streams.

V. STAFF LEAVE AND CONFERENCES

Marti Anderson	Ecological Society of Australia Annual Conference, UQ 28 Nov – 2 Dec 2005, American Fisheries Society, 135th Annual Meeting, Anchorage, USA 11-15 Sep 2005,
Mik Black	New Zealand Statistical Association, Dunedin, July 4-6, 2005
James Curran	6 th International conference on Forensic Statistics, Arizona, March 2005
Rachel Cunliffe	The 55th Session of the International Association for Statistical Education, Sydney, 4-5 April 2005 The 55th Session of the International Statistical Institute, Sydney, 5-12 April
Rachel Fewster	Australasian Ornithological Society Conference
Michael Forster	The 55th Session of the International Association for Statistical Education, Sydney, 4-5 April 2005
Ross Ihaka	The 55th Session of the International Statistical Institute, Sydney, 5-12 April
Brian McArdle	Sabbatical leave taken Semester 2, 2005
Russell Millar	American Fisheries Society, 135th Annual Meeting, Anchorage, USA 11-15 Sep 2005, Fourth International Conference on Business and Industrial Statistics.
Paul Murrell	DSC 2005, Seattle WA
Maxine Pfannkuch	The 55th Session of the International Association for Statistical Education, Sydney, 4-5 April 2005 Fourth Statistical Reasoning, Thinking, and Literacy International Forum (SRTL-4), Auckland, July 2-7, 2005
Geoffrey Pritchard	Equilibrium Models in Wholesale Electricity Markets, Chile Nov 2005 INFORMS 2005, San Francisco, Nov 2005
David Scott	The 55th Session of the International Statistical Institute, Sydney, 5-12 April Mathematics in Industry Study Group Hidden Markov models and complex systems, 29 June -- 1 July, Wanaka New Zealand Statistical Association, Dunedin, July 4-6, 2005

Chris Triggs	6 th International conference on Forensic Statistics, Arizona, March 2005 International Genetic Epidemiology Society : Park City Utah, October 23-24. American Society of Human Genetics, Salt Lake City, Utah, October 25-29. Biostatistics Symposium, University of Washington, Seattle, Washington, November 21-22. Sabbatical leave taken Semester 2, 2005
Chris Wild	55th Conference of Int. Statistical Institute, Sydney, April 2005 Satellite Conference of the International Association for Statistical Education, Sydney Satellite Conference of the International Association for Survey Sampling, Auckland Fourth Statistical Reasoning, Thinking, and Literacy International Forum (SRTL-4), Auckland, July 2-7, 2005
Yong Yang	Interface'05, Princeton, USA, June 2005 New Zealand Statistical Association, Dunedin, July 4-6, 2005
Thomas Yee	5th IASC Asian Conference on Statistical Computing, HK CR Rao Workshop at Ruakura, Waikato Sabbatical leave taken Semester 2, 2005
Ilze Ziedins	The 55th Session of the International Statistical Institute, Sydney, 5-12 April. Mathematical Models for Optimizing Transportation Services, Auckland, 19-22 April. Hidden Markov models and complex systems, Wanaka, 29 June -- 1 July. SPICE (Stats and Prob in Communications Engineering) Workshop, Christchurch, 1 September.

VI COMMUNITY SERVICES

Most service by the Department is in formal roles listed under subheadings below. The following is not covered in that way.

For a long time we have put considerable effort into promoting teaching and learning in secondary schools. This year we worked on three closely intertwined initiatives: CensusAtSchool, curriculum review and development, and teacher workshops.

The Department led an educational enrichment and outreach initiative called CensusAtSchool 2005 Co-directed by Rachel Cunliffe and Chris Wild with an Advisory Board of leaders of national educational, curricular and professional organisations. It built on StatisticsAtSchool 2003 which the Department also ran. The 2005 project was partially supported by an \$80,000 contract from Statistics New Zealand and the Ministry of Education. The project attracted significant TV and print-media coverage. The data-gathering survey phase had over 33,000 student-participants at Year 5-10 level from over 700 schools, and increase in participation rate of 83% from 2003. The teaching resources developed according to the principles and vision of Maxine Pfannkuch, have been lauded by the Royal Statistical Society's Centre for Statistical Education. Launch publicity saw Rachel Cunliffe appearing on *One News*, *Tonight*, *Breakfast* and *Te Kaea*, articles in the *Herald*, *Dominion* and most suburbans. There will be another cluster of publicity with partial releases of results starting with the *Herald On Sunday*. An October press release about results from CensusAtSchool was picked up with prominent stories in a number of places, most notably *The New Zealand Herald*, *The Herald On Sunday*, *Canvas*, and *Principals Today* (which has a small but important readership).

Maxine Pfannkuch serves on the Ministry of Education's Mathematics Curriculum Reference Group as the representative of the New Zealand Statistical Association Education Committee and is also the lead writer for the 2007 new school statistics Years 1 to 13 curriculum. Her knowledge of statistics education research as well as her own research is being utilized to support the development of the statistics curriculum for the next fifteen years. A key competency for all curricula is 'thinking' and Wild and Pfannkuch's research on characterizing statistical thinking has been influential in the development of the new statistics curriculum. An Auckland and Wellington-based group of statisticians, educators and teachers, led by Maxine, has been formed to debate and comment on the statistics curriculum. Matt Regan, Ross Parsonage, and Chris Wild have contributed substantially in this process, particularly in determining important conceptual foundations, since future

technological and software advances must be taken into account in a curriculum development which looks forward so many years.

Our Annual Teacher's day drew over 90 participants despite prominently advertising that we were recycling many elements from the last 2 years. We also exploited synergies with our CensusAtSchool project and our involvement with the new curriculum. Comments like this from an HoD are pleasing, "Reported back to my staff today that your stats course was one of the very best I've been to in 35 yrs – absolutely focused on what a teacher in front of a classroom needs to focus on."

In 2005 members of the Department continued to offer statistical consulting services to members of the University and the wider community.

Part of our new Lies, Damned Lies and Statistics course was developed into a 1-day shortcourse given by Andrew Balemi and Rachel Cunliffe to a group of about 45 civil servants in Wellington. It looks as if it will lead to repeats.

Editorial, Professional Society Officers, and Conference Organisation

Marti Anderson

Editorial Board, *Ecology Letters*.

Editorial Board, *Australian & New Zealand Journal of Statistics*

Organising Committee for Australian Statistical Conference and New Zealand Statistical Association 2006

Rachel Cunliffe

Co-Director, CensusAtSchool 2005

James Curran

Associate Editor, *Science and Justice*

Associate Editor, *Australian & New Zealand Journal of Statistics*

Sam Ferreira

Scientific Support to Elephant Science Round Table, the Minister of Environmental Affairs and Tourism, South Africa

Rachel Fewster

Associate Editor for *Journal of Agricultural, Biological, and Environmental Statistics*

Ross Ihaka

Associate Editor, *Journal of Statistical Software*

Judge, *John M. Chambers Statistical Software Award* (Computing Section of the American Statistical Association)

Organizer invited paper session IMP18 for ISI 55 in Sydney in 2005

Alan Lee

Associate Editor, *Australian & New Zealand Journal of Statistics*

Brian McArdle

Editorial Board for the *New Zealand Journal of Marine and Freshwater Research*.

Renate Meyer

Marsden Fund Mathematical and Information Sciences Panel

Organizer of the Auckland Workshop on Bayesian Inference and MCMC, Feb 24, 2005

Russell Millar

Applications Editor, *Australian and New Zealand Journal of Statistics*

Editorial Board, *Canadian Journal of Fisheries and Aquatic Sciences*

Editorial Board, *New Zealand Journal of Marine and Fisheries Research*

Arden Miller

Associate Editor, *Australian & New Zealand Journal of Statistics*.

Paul Murrell

Assistant Editor for Statistical Graphics Section of ASA
Chair-Elect, Statistical Graphics Section of American Statistical Association
Editorial Board, *R News*
Associate Editor, *Computational Statistics*

Maxine Pfannkuch

Associate Editor, *Statistics Education Research Journal*
Convenor of the Fourth International Research Forum on Statistical Reasoning, Thinking, and Literacy
On the International Program Committee for the 2008 International Commission on Mathematics Instruction study
IASE National Correspondent for New Zealand
Topic Convenor for 7th International Conference on the Teaching of Statistics, Brazil 2006
New Zealand Statistical Association Education Committee

David Scott

Chair of the Organising Committee for Australian Statistical Conference and New Zealand Statistical Association 2006

Chris Triggs

Associate Editor, *Biometrics*

Chris Wild

President of the International Association for Statistics Education (IASE)
Council Member, International Statistical Institute
Associate Editor, *International Statistical Review*
Chair of the Search Committee for Editor of the Statistics Education Research Journal 2005
ISI 55 Programme Co-ordinating Committee for Sydney 2005
ISI 55 IASE Programme Chair for Sydney 2005
ISI55 IASS (International Association for Survey Sampling) Programme Committee for Sydney 2005
Programme Chair for IASS Satellite Conference on Complex Sampling, Retrospective Sampling and Missing Data, Auckland 2005
Advisory Committee, 4th International Research Forum on Statistical Reasoning, Thinking, and Literacy, 2005
Co-Director CensusAtSchool NZ 2005
Organizer invited paper session IMP 48 for ISI 55 in Sydney in 2005
ISI56 IASS (International Association for Survey Sampling) Programme Committee for Lisbon 2007
ISI 56 Programme Co-ordinating Committee for Lisbon 2007

Thomas Yee

Associate-Editor, *Computational Statistics*
Session Organiser, Asian Regional Section of the International Association for Statistical Computing (IASC), a Section of the International Statistical Institute (ISI), at its 5th Conference in Hong Kong, 16-17 December, 2005.
IASC Scientific Programme Committee for ISI 56 Portugal 2007

Ilze Ziedins

Associate Editor, *Stochastic Models*
Associate Editor, *Australian and New Zealand Journal of Statistics*
East Asia and Pacific Regional Committee of the Bernoulli Society
Organizer invited paper session IMP18 "Stochastic Networks" for ISI 55 in Sydney in 2005

In addition, the following staff reported serving as referees for the indicated publications (incomplete list):

Marti Anderson	Computational Statistics and Data Analysis, Aquatic Living Resources, The Herpetological Journal, Ecology Letters, Ecology, Journal of Statistical Computation and Simulation, Journal of Applied Ecology, Marine Ecology Progress Series + Granting Agencies: Natural Environment Research Council (NERC) Research Grant, Alaska Sea Grant Program
Mik Black	Applied Bioinformatics, Bioinformatics, Biometrics, Health Economics, Journal of Agricultural Biological and Environmental Statistics, Journal of

the American Statistical Association, Journal of the Royal Statistical Society Series B, Plant Cell.

James Curran	Law, Probability and Risk, the Journal of the Forensic Sciences, JABES (Journal of Agricultural, Biological, and Environmental Statistics) Forensic Science International
Rachel Fewster	Australian and New Zealand Journal of Statistics, Biological Conservation, Biometrics, Computational Statistics and Data Analysis, Ecology Letters, Journal of Applied Ecology
Sam Ferreira	South African Journal of Wildlife Research, African Journal of Ecology, Conservation Biology
Alan Lee	Scandinavian Journal of Statistics, Communications in Statistics, Annals of the Institute of Statistical Mathematics
Brian McArdle	Ecography, Royal Society (UK) - e-Pubs: Biology Letters NZ, Journal of Marine and Freshwater Research, Ecography, Biological Letters, Australian and New Zealand Journal of Statistics.
Patricia Metcalf	Diabetes Care, European Journal of Clinical Nutrition, New Zealand Medical Journal, Age & Aging, International Journal of Social Science and Medicine
Renate Meyer:	ANZJS, CJFAS, Ecology, Interface, Physica A and Journal of Computational Statistics, Physical Review E, Computational Statistics and Data Analysis, Biometrics, Book review for Wiley, Grant applications for Alaska Sea Grant, Lister Institute for Preventive Medicine, Arthington Davy Fund
Russell Millar:	Refereed 11 manuscripts for various fisheries and statistical journals, Grant application for the Canadian National Program for Complex Data Structures
Arden Miller:	Technometrics, Journal of Quality Technology, and Quality Technology and Quantitative Management.
Maxine Pfannkuch.	Educational Studies in Mathematics Education Journal, Statistics Education Research Journal, Mathematics Education Research Journal, Delta 05 Conference proceedings, 7th International Conference on Teaching Statistics proceedings
Geoff Pritchard:	Mathematical Programming, NZ Journal of Mathematics
David Scott:	Computational Statistics, Statistical Methodology
Chris Triggs:	Nucleic Acids Research, Jurimetrics, Forensic Science International, Journal of Forensic Science, New Zealand Journal Crop and Horticultural Science
Thomas Yee:	Annals of the Institute of Statistical Mathematics, Australian and New Zealand Journal of Statistics, Ecological Modelling, Ecology
Ilze Ziedins:	Journal of Applied Probability, Queueing Systems

VII OTHER MATTERS

Staffing changes

In 2007 the Department made 3 new appointments. James Curran, an Auckland PhD, arrived to take up a senior lectureship in July. His main field is the statistics of forensic science with a particular focus on glass evidence and DNA evidence. He is an Associate Editor of *Science and Justice* and also the *Australia and New Zealand Journal of Statistics*. Sharon Browning, whose fields are statistical genetics and stochastic processes was appointed to a lectureship and arrived in October. Catherine Loader from Case Western Reserve University has

accepted an Associate Professorship and will arrive mid-2006. A New Zealander with a Stanford PhD, her specialties are nonparametric regression and computational statistics.

Unfortunately, Mik Black, resigned at the end of the year effective May 2006.

In 2005, promotions were obtained by Andrew Balemi, Stephanie Budgett, Christine Millar and Geoffrey Pritchard. Chris Triggs and Thomas Yee undertook successful Research and Study Leaves and Brian McArdle is midway through a full-year sabbatical.

Administration

Many people contributed to the smooth running of the Department in 2005. Special thanks are due to all our administrative and computer staff. The following staff provided valuable service to the Department in specific areas:

- HoD Chris Wild
- Department Manager Sharon Walker
- Tamaki Head Chris Triggs
- Director of Consulting Service Alan Lee

Committee Convenors

- Academic Chris Triggs
- Consulting Alan Lee
- Graduate David Scott
- IT Ross Ihaka
- Library Ilze Ziedins
- Research Russell Millar
- Staff-Student Joss Cumming
- Student life Rachel Fewster
- Teaching Development Ross Parsonage

Year-level coordination

- Stage 1 Matt Regan
- Stage 2 Mike Forster
- Stage 3 Chris Triggs

Postgraduate

- Graduate Officers
 - Masters & Hons David Scott
 - PGDipSci Brian McArdle/Mike Forster
 - PhD Renate Meyer
- Graduate Advocate Rachel Fewster

Operations Research Programme

Ilze Ziedins

Research Group Leaders

- Bayesian Statistics Renate Meyer
- Statistical Ecology and Bioinformatics Marti Anderson
- Industrial Statistics Arden Miller
- Medical Statistics Patricia Metcalf
- Operations Research & Stochastic Processes Ilze Ziedins
- Statistical Computing Ross Ihaka
- Statistics Education Matt Regan

Other

- Maori and Pasifika Wiremu Solomon, Susan Wingfield
- Timetable Matt Regan/Christine Miller
- Library Geoffrey Pritchard and Thomas Yee
- Seminars Arden Miller/James Curran
- Open Day Coordinator Mik Black
- Undergraduate Enrolment Christine Miller
- Undergraduate Advice David Smith and Christine Miller

- 10x and 20x Administrator David Smith
- Tutor Coordinator David Smith
- City Demonstrators David Smith
- Tamaki Demonstrators Ross Parsonage
- CECIL Liaison Matt Regan/Christine Miller
- Coordinator BTech (IM) Arden Miller
- Women in Science and Engineering Marti Anderson

Departmental Representative or Service on Faculty Committees

- Fac. Science Academic Chris Triggs/Geoffrey Pritchard
- Fac. Science IT Managers Werner Schmidt
- Fac. Science IT Academic Paul Murrell
- Fac. Science EO Wiremu Solomon
- Fac. Science Maori Responsiveness Ross Ihaka
- Fac. Science Maori and Pacifika in Sci Susan Wingfield
- Fac. Science Library Ilze Ziedins
- Fac. Science Postgraduate David Scott
- Fac. Science Staffing Ilze Ziedins, Alan Lee
- Faculty of Bus. And Econ. Chris Wild
- Faculty of Arts Geoffrey Pritchard
- Faculty of Arts BUGS Maxine Pfannkuch
- Faculty of Engineering Arden Millar
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- UoA Subcommittee Reconstituting the Rununga* Ross Ihaka
- Marsden Fund Mirror Panels* Rachel Fewster, Marti Anderson, Russell Millar
- Women in Science and Engineering* Marti Anderson
- Liaison with Auckland Mathematical Association* Matt Regan
- Year 13 students liaison* Matt Regan

Additionally:

Marti Anderson was a member of a task force for the development of strategic initiatives to enhance the relationship between the University of Auckland and Auckland Regional Council, and server on an inter-departmental group of researchers to advise on RIMS implementation for grant applications

Rachel Cunliffe served on the UoA Web Managers Forum, and was Co-director of CensusAtSchool 2005

Alan Lee served as Acting Head of the Department of Exercise and Sports Science

Alastair Scott served as a member of the Parliamentary Advisory Committee on Official Statistics, a member of the FRST Post-doctoral Reference Group and on the Executive of the Centre for Health Services Research and Policy

Chris Triggs served as Associate Dean of Science (Tamaki) and on the Board of Studies for Forensic Science,

Chris Wild served on Finance Functions Review Committee, the Administration Review Committee, the Board of Studies for General Education, the Academic Heads Advisory Group, the APR Implementation Group, the UoA Teaching Excellence Awards Selection Panel, the RIMS test group, contributed to workshops for the mid-year New Heads Induction, Future Heads Talking Heads session, New Heads Mentoring Workshop, Academic Heads' Role in Performance Reviews, was an HOD mentor, and was Co-director of CensusAtSchool 2005

Uniservices

Year	Revenue	Increase	Billings	Increase
2001	\$41,642		\$52,549	
2002	\$103,841	149%	\$162,525	209%
2003	\$247,747	139%	\$299,805	84%
2004	\$546,941	120%	\$593,182	98%
2005	\$600,514	10%	\$723,453	22%

VII OVERALL COMMENTS ON PROGRESS WITHIN THE DEPARTMENT

Student numbers, which hit an all-time high in 2004 remained constant in 2005. A drop of about 5% has been forecast for 2006 as a result of restructuring. We have been very pleased by the way the Faculty has moved from Budget 2004 on to address indicators of pain such as high student-to-staff ratios and a very high contribution rate. Three new permanent positions were filled in 2005 and there are new positions in the 2006 budget. We are looking forward to the opportunity the new positions provide to advance some of our strategic priorities in areas such as survey sampling and social statistics, molecular technologies, statistical computing and data mining, business, ecology, and medical statistics.

Research productivity was up by 14%. Uniservices revenues were up by 22%, pleasing progress after a pattern of extremely strong growth in that area with Marti Anderson again being the greatest contributor by a wide margin. There are still more innovative approaches being developed in teaching (particularly around the use of new technology) and programmes. The financial health of the Department continues to depend on the continuation of our role as the providers of Statistics service teaching across the University. We take this role very seriously, and continuously strive to improve the quality of our courses as evidenced by our 2003 National Teaching Award. The great strength of this Department in teaching has been further recognised by Dean of Science Distinguished Teaching Awards to statistics staff members in both 2004 and 2005. Our biggest problem is still lack of space on the City campus and the mismatch between where our work is and where many staff are accommodated leading to much downtime in travelling.

This is a great Department in which to be HOD. I am very grateful to all staff in Statistics and the team at the Faculty of Science for the excellent support they provide.

Chris Wild

HoD, Department of Statistics

February 2006