DEPARTMENT OF MATHEMATICS

ANNUAL REPORT 2004

PREAMBLE

The Department of Mathematics comprises over 70 established and temporary academic staff, based on two sites (the City campus and Tamaki campus). With the number of its equivalent full-time students totalling just under 900 in 2004 the Department is one of the largest in the Faculty of Science and, hence, in the University of Auckland, offering courses at all levels for students in several Faculties.

Highlights for the Department in 2004 included the following:

- Professor Marston Conder was elected incoming President of the Academy of the Royal Society of New Zealand. He was also elected as a Fellow of the Canadian Institute of Combinatorics and its Applications, and an honorary life member of the New Zealand Mathematical Society, and was awarded one of the two inaugural Hood Fellowships.
- Professor Boris Pavlov was elected as a Fellow of the Royal Society of New Zealand.
- Dr Paul Bonnington was elected President of the Combinatorial Mathematics Society of Australasia.
- Associate Professor Eamonn O'Brien received the New Zealand Mathematical Society's Research Award.
- Professors Gaven Martin and Boris Pavlov, Associate Professor Eamonn O'Brien, Dr Warren Moors and Dr Garry Tee were appointed to Editorial Boards of international research journals.
- Marsden grants were awarded in the 2004 round to Associate Professors Jianbei An and Eamonn O'Brien and Professor Marston Conder, Drs Jiling Cao and Warren Moors, Professor Gaven Martin, Dr Geoffrey Nicholls, and Professor James Sneyd.
- The Department received an award from the University for Excellence in Equal Opportunities.
- Associate Professor Jozef Siran, formerly of the Slovak Technical University, Bratislava, took up his appointment in February. He holds a Doctor of Science degree from the Slovak Academy of Sciences and Comenius University and has research interests in combinatorial problems of algebraic or topological flavour.
- Dr Sina Greenwood, formerly a New Zealand Science and Technology Post-Doctoral Fellow in the Department, took up her lectureship in February. Dr Greenwood's PhD degree is from the University of Auckland and she specialises in set theoretic topology.

At the end of the year Dr Roderick Gover was promoted to Associate Professor, while Drs Vivien Kirk, Michael Meylan and Warren Moors were promoted to Senior Lecturer.

The Department had a significant number of Post-Doctoral Fellows during the year : Drs Jiling Cao (all year), Richard Evans (until March), Sina Greenwood (until February), Mark Harmer (until November) and John Holt (from May) held New Zealand Science and Technology Post-Doctoral Fellowships while Drs Richard Evans (from April), Bart Oldeman (from June), Primoz Potocnik (from July) and Jana _iagiová (from July) held New Zealand Institute of Mathematics and its Applications Post-Doctoral Fellowships.

A major disappointment for the Department was the departure of two of its senior analysts. The return to the United States of America of Associate Professor Norman Levenberg was probably inevitable but the transfer of Professor Gaven Martin to Massey University was not. On top of previous and forthcoming retirements of other analysts the loss of these two has dealt a serious blow to our strength in this fundamental area of mathematics, and efforts must be made to rebuild.

I. DEVELOPMENTS IN TEACHING AND LEARNING

The Department provides teaching in courses for students in several Faculties, especially Arts, Business and Economics, Engineering and Science. A major part of this is service teaching, mathematics providing a crucial part of many different majors.

For the 2004 academic year student enrolments totalled approximately 892 EFTS, including 828 undergraduate (756 on the City Campus and 72 on the Tamaki Campus) and 64 graduate EFTS.

2004 saw the introduction of a number of new courses and modifications to existing ones. The main change to Stage I and II was the combining of the two paths MATHS 130 and 230 and MATHS 151 and 152, which were mainly for those planning to major in Mathematics , into a single path MATHS 150 and 250. At the same time we introduced modifications to the path MATHS 108 and 208 for those using Mathematics in a service role. At the Stage III level we discontinued our 1-point courses, replacing them in one case by a new 2-point course, and also introduced a new course in Applied Mathematics.

One of the aims of reorganising our courses was to boost our graduate student numbers. We encourage all students majoring in mathematics to take MATHS 328, Algebra and Applications, before MATHS 320, Algebraic Structures. Along with MATHS 332, Real and Complex Analysis, and MATHS 333, Multivariable Analysis, these courses form a basic core which every graduate student in mathematics should have taken. The latter two of these courses are an amalgam of the old 1-point courses MATHS 330, 335 and 345 and the 2-point course MATHS 331.

For students majoring in Applied Mathematics we are now offering an integrated package of the old courses MATHS 361 and 362, as well as a new course, MATHS 363, Computational Mathematics and Modelling.

With the introduction of these new courses, considerable effort has been put into preparing teaching materials. For the Stage I courses we established two teams of staff who worked hard over the latter half of 2003 and through the summer preparing both printed coursebooks and cross-referencing compact discs. Students' reactions to these have been positive. As the material has been classroom tested it has also been corrected and updated.

Considerable time was also spent on developing new material for the course MATHS 153 which is offered jointly with Engineering Science. Begun several years ago, this course offers University Mathematics to top final year High School pupils. Some of those pupils go on to study other subjects but many are attracted to Engineering and Science. This year, for the first time, this course was offered online to students outside Auckland. We had students both from major cities like Tauranga and Wellington and from small towns like Hawera and Te Kuiti.

Again this year, we were able to use temporarily vacant space to run tutorials for all of our Stage I Pure Mathematics courses (the Stage I Applied Mathematics course has laboratories in lieu of tutorials). We are grateful to the efforts of the Science Faculty in trying to locate suitable rooms for our tutorials. Ideally, these rooms would be specially fitted out for our needs. It is a matter of regret that, after over one third of a century on the University staff and nearly a quarter of a century after first being appointed Head of the Department and despite two reports from Review Committees recommending facilities, I see that our ability to run the tutorials that are recognised world-wide as being an essential feature of University Mathematics learning remains frail as we are still not guaranteed the proper space.

The other two major components of our student interface outside of lectures, using the Assistance Room and the marking of assignments, continue to work well. Tutors and markers are given appropriate training and support through compulsory workshops as well as guidebooks produced by the Department.

II. OTHER STUDENT MATTERS

Scholarships and Prizes

Senior Scholarship in Applied Mathematics (joint award)	Simon Young/Matthew Peek
Senior Scholarship in Mathematics	Simon Marshall
Annual Prize in Applied Mathematics	Elan Gin
Annual Prize in Mathematics	Simon Marshall
Collins Prize	Elan Gin
Margaret Morton Memorial Prize	Manasa Ramakrishna
Mathematics Education Prize (joint award)	Michelle Freeman
	Lynda Merriman
Mathematics Education Technology Prize	Peter Watson

Summer Scholarships
Twelve students were engaged in research projects over the summer 2003-4, with scholarship support from the Department, staff research grants and the Faculty of Science. The basic aim of the scheme is to introduce senior undergraduates to mathematical research. Some others assisted staff with computational or practical aspects of individual research projects. This programme of summer scholarships has proved invaluable to both students and staff over the years and we hope to continue to be able to offer it in the future.

Aldis Scholarships
These scholarships are discussed in more detail in Section IV. They are awarded to very able students from decile 1 and 2 High Schools to enable them to enrol in a Summer Season course in Mathematics.

Student/Staff Liaison Committee
Mr Greg Oates continued to convene ably this Committee, with Ms Wendy Stratton standing in for him while he was on leave in the Second Semester. The meetings continue to attract a full room of student and staff representatives with a range of important issues discussed.

III. EQUAL OPPORTUNITIES

While a significant number of mathematically gifted people are female, women are still in the minority amongst our students; slightly fewer than 40% of our students are female. This situation carries on to the pool of candidates for appointment to the Academic staff of the Department. Only five of the 36 permanent Academic staff and six of the 13 long-term contract Academic staff are female. Typically, few of the applicants for permanent academic positions are female.

Given the difficulties we might expect in attracting and retaining female Academic staff, 2004 must be considered to have been a good year. Early in the year Dr Sina Greenwood took up her lectureship in the Department. We now have twice as many female members of the permanent Academic staff as we did two years ago. At the end of the year it was announced that one of these, Dr Vivien Kirk, is to be promoted to Senior Lecturer from 2005, while two long term female members of the Academic staff, Ms Judith Paterson and Ms Wendy Stratton, were promoted over Senior Tutor bars.

Dr Greenwood's appointment is a boost for our Equal Opportunities activities in another way : she is of Samoan ancestry, surely one of the first women of Samoan ancestry to receive a PhD in Pure Mathematics. Even before her appointment to her lectureship, Dr Greenwood made significant contributions to the Department's efforts to improve the situation for Maori and Pasifika students.

Almost two thirds of the students enrolled in the Department are ethnically Asian and most of those are of Chinese origins. Thus, it is important that the Department has two permanent Academic staff who are themselves of Chinese origins. The Department offers tutorials conducted by staff fluent in Mandarin and Cantonese to support those students who are struggling because of their language.

The Department makes special efforts both for those students whose background in mathematics is weak and for those very able students. For the former we continue to be active in the Tertiary Foundation Certificate. Some of the new courses offered this year are aimed at the latter and we would like to encourage as many of these students as possible to go on to graduate studies. In addition to this, several staff, especially Professor Ivan Reilly and Dr Arkadii Slinko, have been actively involved in the Mathematics Olympiad for many years.

Many staff have been involved in school visits to encourage students, particularly from under-represented groups, to study mathematics. The ongoing Mathematics Enhancement Project being run by members of the Mathematics Education Unit in Manukau City deserves particular mention as it involves regular and frequent school visits.

IV. TREATY OF WAITANGI

This Department has taken its Treaty obligations seriously for many years. It was therefore gratifying that this was recognised in August this year by an award to the Department by the University for Excellence in Equal Opportunities. The citation of this award reads "For longstanding and high quality efforts to increase the recruitment and performance of Maori and Pacific students and appointment of Maori and Pacific staff."

In addition to the activities reported at the end of 2003, this year's initiatives include:

- Dr Greenwood, following her appointment as Lecturer, has taken a more managerial role in developing and consolidating our activities.
- Several Maori and Pasifika staff visited High Schools in Northland with the aim of encouraging their students to study mathematics at this University.

Our Aldis scholarship programme for Maori and Pasifika students from low decile schools continues to flourish, bringing students to the University during the Summer Session when they can establish themselves in the University before the bulk of the students arrive in late February. Having been well-mentored these students themselves go on to be good mentors for later arriving students.

So far the Department has been able to fund the Aldis scholarships through a grant from the Faculty of Science's Equal Opportunities Initiatives and the Department's own resources. With continuing reductions in the Department's operating expenditure and notice being given by the Faculty that its funding for the Aldis scholars for the summer 2004/5 is the last time, it is not clear how we might be able to continue this successful programme. Unfortunately, while most of the Aldis scholars continue on with their degree studies, not all of them continue on in mathematics so we cannot point to increased EFTS in the Department as a result of this initiative : the whole University benefits.

V. RESEARCH

By any measure except the PBRF averaging process, the Department is the top Department of Mathematics in New Zealand and is up with the best in Australia. We have a very strong research programme with several staff among the world leaders in their fields and a significant number of middle rank staff also making their mark on the world. We continue to receive significant research awards and funding : a new Fellow of the Royal Society of New Zealand, the President elect of the Academy of the Royal Society of New Zealand, five successful grant applications involving eight staff were made to the Marsden Fund. Especially over the summer, but also at other times, we host numerous international conferences. While, as noted later, all this strength has translated into a big increase in research productivity, it has not yet translated into a big increase in PhD student numbers; indeed, the number of PhD students has declined this year as a larger number than usual have completed and not been replaced by new students. A major cause of this decline must be the difficulty of finding the money to pay the very high international fee.

I now want to draw especial attention to the research work of six members of the Department who have been elected as a FRSNZ, received the Research Award of the New Zealand Mathematical Society or been promoted. This will give some idea of the scope and depth of the research taking place within the Department but it should be noted that many other staff members have been involved in outstanding research work.

- With a US collaborator Thomas Branson, Dr Roderick Gover discovered new global conformal invariants which are sensitive to cohomology and examples suggest they provide a new analytic approach to obtaining topological information.
- Dr Vivien Kirk has recently found, in joint work with US collaborator Edgar Knobloch and UK collaborator Alan Champneys, theoretical explanations for observed behaviour of global bifurcations of some differential equations. With local collaborators she is looking at the roles of bifurcations in calcium wave propagation.
- With a student Malte Peter, Dr Michael Meylan has extended multiple water wave scattering theory to infinite water depth and bodies of arbitrary geometry. This theory has particular application in the Antarctic where there is a need to determine wave scattering from fields of ice floes.

- With a Bulgarian mathematician, Petar Kenderov, Dr Warren Moors found very general topological conditions under which a real-valued function on a product space is continuous on a large subset knowing only that it is separately continuous.
- Associate Professor Eamonn O'Brien has special interests in the development, implementation and application of algorithms in the study of groups. Examples of his work include the now standard algorithm for constructing random elements of a group and the classification of the groups of order at most 2000.
- With others Professor Boris Pavlov has been involved in the study of resonance transport properties of quantum networks. They have applied their ideas to the mathematical design of a resonance quantum switch and spin-filter.

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(G) Professional and technical reports

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532: Strip temperature in a metal coating line annealing furnace, by Mark McGuinness, Stephen Taylor

531: A new proof of the girth-chromatic number theorem, by Simon Marshall

530: The ideal generated by sigma-nowhere dense sets, by Jiling Cao and Sina Greenwood

529: On the Existence of Extremal Cones and Comparative Probability Orderings, by Simon Marshall

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523: Asymptotics of the triangle groups and the associated spectra, by M. Harmer

522: Barely Baire Spaces and Hyperspaces, by J. Cao, S. Garcia-Ferreira and V. Gutev

521: Quasicontinuous selections of upper semicontinuous set-valued mappings, by Jiling Cao and Warren B. Moors

520: A New Interpretation of the Selberg Trace Formula, by P. Cartier and A. Voros

519: How to Exhibit Toroidal Maps in Space, by Dan Archdeacon, C. Paul Bonnington, Jo Ellis-Monaghan

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517: Simulation of ancestral graphs for Monte Carlo integration, by Nicoleen Cloete, Geoff K. Nicholls and David J. Scott

516: Separate Continuity, Joint Continuity and the Lindelof Property, by Petar S. Kenderov and Warren B. Moors

515: Rankings of Multisets and Discrete Cones , by Marston Conder, Simon Marshall, Arkadii Slinko

514: Fitting Parameters for a Solvable Model of a Quantum Network, by M. Harmer

513: Surface Area and Capacity of Ellipsoids in n Dimensions, by Garry J. Tee

512: Exploratory analysis of similarities between common voting rules, by John C. McCabe-Dansted and Arkadii Slinko

511: Direct and Inverse Boundary Uniqueness Theorems for Analytic Functions Smooth in the Closed Unit Disc, by Jeong Eun Lee, Boris Pavlov

510: On the Graphs of Hoffman-Singleton and Higman-Sims, by Paul R. Hafner

509: A Counterexample to Fishburn's Conjecture, by Marston Conder and Arkadii Slinko

508: Modelling of Quantum Networks, by A. Mikhailova, B. Pavlov, L. Prokhorov

(H) Refereed designs

(I) Patents

(J) Major original creative works

(K) Other works

MCKENZIE, H., PARNELL, S., STATHAM, M. 'Hands Feet and Other Body Parts'. Workshop presented at the 3rd annual Conference of the New Zealand Association of Bridging Educators. 2004. (Also published in the New Zealand Mathematics Magazine, vol 41 no.3, 25-32, 2004).

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OTHER MATTERS RELATED TO RESEARCH ACTIVITIES

Diploma, Honours and Masters Students

Name	Thesis Topic/Title	Supervisor(s)
Elan Gin	Horseshoe Orbits (Project)	Dr P. Sharp
Kate Lee	Image reconstruction	Dr C. Fox
Jane Hyo Jin Lee	Design and Implementation of General Linear Methods	Prof. J.C. Butcher
John McCabe-Dansted	Approximability and Computational Feasibility of Dodgson's Rule (Project)	Dr A. Slinko, Dr G. Pritchard
Garry Nathan	Topics in Mathematics Education	Assoc. Prof. B. Barton
Elizabeth Sneddon	An Investigation of the Team Skills Developed by Collaborative Tutorials	Dr H. Bartholomew
Kaimin Zhang	The Representation of Finite Groups	Assoc.Prof. J. An & Assoc.Prof. E. O'Brien

PhD Students

The following students completed their PhD degrees during the year.

Name	Thesis Topic/Title	Supervisor(s)
Shehenaz Adam	Ethnomathematics in the Maldivian Curriculum	Assoc.Prof. B. Barton & Dr M. Pfannkuch
Sione Na'a-Pangai Ma'u	Plurisubharmonic Functions of Logarithmic Growth	Assoc.Prof. N. Levenberg
Sasha Rubin	Automatic Structures	Assoc.Prof. E. O'Brien & Assoc. Prof. B. Khoussainov (Computer Science)
Jamie Sneddon	Minors and Planar Embeddings of Digraphs	Dr P. Bonnington & Prof. M. Conder
Krasimira Tsaneva-Atanasova	Mathematical Biology	Prof. J. Sneyd
Brian Van Dam	Construction of Topological Spaces via Resolutions	Prof. D. Gauld & Assoc.Prof. M. Vamanamurthy (Advisor)

Current PhD students.

Name	Thesis Topic/Title	Supervisor(s)
Willy Alangui	Mathematics and Culture	Assoc.Prof. B. Barton
Renu Choudhary	Functional Analysis	Assoc.Prof. B. Calvert
Nicoleen Cloete	Probability theory and Stochastic Processes with application in population genetics and phylogenetic (Biological Sciences) inference	Dr G. Nicholls & Assoc.Prof. D. Scott (Statistics)
Greg Ewing	Migration-genealogy coalescent processes	Dr G. Nicholls & Prof. A. Rodrigo (SBS)
Alan De Los Santos	Graphics Calculators in Mathematics Learning	Assoc.Prof. M. Thomas
David Godfrey	Learning Algebra: The Arithmetic-Algebra Interface	Assoc.Prof. M. Thomas & Dr K. Irwin (Education)
Jianhua (Jeff) Gong	Geometry & Analysis	Prof. G. Martin & Assoc.Prof. N. Levenberg
Gareth Hegarty	Control theory and partial differential equations	Dr S. Taylor
Erin Higgins	Modelling calcium transients in cardiac myocytes	Prof. J. Sneyd

Shirley Huang	Numerical Methods for ODEs	Prof. J. Butcher & Dr R. Chan
Edward Huang	Representations of Finite Groups	Assoc.Prof. J. An & Assoc.Prof. E. O'Brien
Barbara Kensington-Miller	Professional Development of mathematics teachers in low decile 2 schools	Assoc. Prof. B. Barton & Prof. Stuart McNaughton (Education)
Barbara Miller-Reilly	Affective change in adult students returning to the study of mathematics	Dr K. Irwin (Education) & Dr C. Brown
Nicolette Moir	Numerical Analysis	Prof. J. Butcher & Dr R. Chan
Greg Oates	Technology and the Mathematics Curriculum	Assoc.Prof. M. Thomas & Assoc.Prof. B. Barton
Judith Paterson	Participation in professional development & its influence on pedagogical change for mathematics teachers	Assoc. Prof. B. Barton
Debasish Roy	Markov chain Monte Carlo algorithms, Bayesian Inference, Inverse problems	Dr G. Nicholls & Dr C. Fox
Joseph Silhan	Differential geometry	Dr R. Gover & Dr A. Blaom
Sepideh Stewart	Conceptual understanding of linear algebra	Assoc. Prof. M. Thomas & Prof. I. Reilly
Angela Tsai	Applied Mathematics – Numerical Analysis	Prof. J. Butcher & Dr R. Chan
Chung-Ju (Jeff) Tsai	Complex Analysis & Geometry	Prof. G. Martin & Assoc.Prof. N. Levenberg
David Welch	Stochastic models of population dynamics	Dr G. Nicholls, Prof. A. Rodrigo (Biology), Dr W. Solomon

Research Visitors

Visitor	Affiliation
Prof Len Bos	University of Calgary
Prof. Walter Bossert	University of Motreal
Dr Gosia Broothers	TI, Dallas Texas
Professor Alan Champneys	Bristol University
Prof Carl de Boor	University of Wisconsin-Madison
Stefano de Marchi	University of Verona
Dr. Charles Eaton	UMIST
Prof Bettina Eick	University of Braunschweig
Dr Ruhama Even	Weizmann Institute, Israel
Prof Hershel Farkas	Hebrew University
Prof. Paul Fong	University of Illinois at Chicago
Takeo Fujihira	Imperial College
Dr Chris Good	University of Birmingham
Dr. Kevin Grazier	Jet Propulsion Laboratory
Dr Frances Griffin	Macquarie University
Prof Eric Grinberg	University of New Hampshire
A/Prof Valentin Gutev	University of KwaZulu-Natal
Prof. George Havas	University of Queensland
Prof Derek Holton	Otago University
Professor Arieh Iserles	Cambridge University
Satish Iyengar	Mathematics, Canterbury

Alice Jukes	Imperial College
Prof. Hadi Kharaghani	University of Lethbridge (Alberta)
Professor Edgar Knobloch	Leeds University
Dr Ville Kolehmainen	Applied Physics, University of Kuopio, Finland
Dr Jeroen Lamb	Imperial College
Dr Felipe Leitner	University of Stuttgart
Prof Dany Leviatan	Tel Aviv University
Prof. Doug Lind	University of Washington
Professor Jerrold Marsden	Caltech
Professor Robert McLachlan	Massey University
Dr Abdul Mohamad	Sultan Qaboos University, Oman
Prof. Herve Moulin	Rice University
Professor M.F. Newman	Australian National University
Portia Neydorff	TI, Melbourne
Dr Pawel Nurowski	University of Warsaw
Prof Peter Nyikos	University of South Carolina, USA
Mr Carlos Perez	Universidad de Las Palmas de Gran Canari
Mr Malte Peter	Unversity of Bremen
Dr Larry Peterson	University of North Dakota
Prof Allan Pinkus	Technion
Prof Zbigniew Piotrowski	Youngstown State University, Ohio
Assoc Prof Reinout Quispel	LaTrobe University
Prof Bruce Richter	University of Waterloo
Mr Brett Ryland	Massey University
Mr Nico Schloemer	Dresden University, Germany
Yajuan Sun	LaTrobe University
Prof V.S. Sunder	Institute of Math. Sciences, Madras
Mr Adam Szereszewski	Warsaw University
Ms Priscilla Tse	LaTrobe University
Mr Richard Vale	University of Glasgow
Dr Marco Vianello	University of Padua
Prof Mark Watkins	Syracuse University
Prof Xinyuan Wu	Nanjing University
Prof Lee Peng Yee	NIE, Nanyang Technological University, Singapore
Prof Zvi Ziegler	Technion, Israel

Seminars by Visitors, Honorary Research Fellows, Staff and Research Students

Hadi Kharaghani (University of Lethbridge (Alberta))	Bush-type Hadamard matrices; structure and applications
Jacques Sakarovitch (CNRS / ENST, Paris)	Finite automata and number systems
Satish Iyengar (Mathematics and Statistics, Canterbury)	Diffusion Models for Neural Activity
Andre Nies (Computer Science, The University of Auckland)	Quasi-finitely axiomatizable groups
John F. Brewster (Department of Statistics, University of Manitoba)	Post-Data Pivotal Inference in the Balanced One-Way Random Effects Model
Bill Barton, Rob Chan, Chris King	Undergraduate Mathematics & English Language Proficiency
Robert McLachlan (Institute of Fundamental Sciences, Massey University)	Dynamical systems that preserve foliations
Lee Peng Yee (National Institute of Education, SIngapore)	Subject knowledge in mathematics for school teachers
Ralph Stohr (University of Manchester)	On Klyachko's Theorem on Lie representations

Robert McLachlan (Institute of Fundamental Sciences, Massey University)	Another good reason to arrange points on a sphere
Alona Ben-Tal (Bioengineering Institute, The University of Auckland)	When the lung meets the heart: mathematical modeling of the cardio-respiratory system
Paul Hafner	From the Steiner system S(2,5,21) to S(5,8,24) via the Higman-Sims graph
Donald R. Love (School of Biological Sciences, Auckland University)	Do fish and mathematics have anything in common (a tale of perturbed gene expression programming)?
Sean Oughton (Department of Mathematics, University of Waikato)	Decay of 2D Navier-Stokes Turbulence
Rosalind Archer (Engineering Science, The University of Auckland)	The Green Element Method for Solving PDEs
Mark Watkins (Syracuse University (Syracuse NY, USA))	A Characterization of Infinite Planar Primitive Graphs
Sina Greenwood	PCF theory
Mark Titchener (Dept of Computer Science, The University of Auckland)	Randomness is, as Randomness does
Arkadii Slinko	Decision Rules, Quivers, and Relative Uncertainty Aversion
Rod Gover	From similar triangles to quantum gravity
Jiling Cao	Banach category theorem
Steven Butt (Dept of Industrial and Manufacturing Engineering, Western Michigan University)	Investigation of the Effect of Nursing Activities and the Built Hospital Environment on Nurse Health and Productivity
John Butcher	Diagonally implicit and singly implicit methods for stiff problems
Mike Meylan	Linear Operator Theory and Linear Water Waves
Malte A. Peter (University of Bremen, Germany)	Micro-macro modelling of diffusion-reaction processes in composite materials
Simon Marshall (The University of Auckland)	On the Existence of Extremal Cones and Comparative Probability Orderings
David McIntyre	A brief history of the Normal Moore Space Conjecture
Anthony Blaom	Geometric structures as deformed symmetries
Robert McKibbin (IIMS, Massey University at Albany)	Getting layered: Some experiences with non-homogeneities
Rolf Jeltsch (Seminar for Applied Mathematics, ETH Zurich)	Multidimensional Upwind Methods for the Advection Equation with Constraints
David Gauld	An irregular leave, or what I did in France.
Philip Sharp	Elliptic Horseshoe Orbits and their applications
Mick Roberts (IIMS, Massey University, Auckland, NZ)	Modelling strategies for minimising the impact of an imported infection - SARS and smallpox
Mark McGuinness (Victoria University of Wellington)	In a Heartbeat - A Delay Recruitment Model of the Cardiovascular Control System.
Frances Griffin (Macquarie University)	Randomised online quizzes for mathematics
James Sneyd	The mathematics of calcium
Piaras Kelly (Department of Engineering Science, The University of Auckland)	Mathematical Modelling of Composite Materials Manufacturing Processes.
Matt Perlmutter (Massey University)	The geometry of reduced cotangent bundles
Michael Parkinson (Mathematics & Statistics, The University of Auckland)	Tracking your Citations
Arno Berger (Department of Mathematics and Statistics, University of Canterbury)	Digits, Dynamics, and Benford's Law

Judith Ocean (Monash University)	Curriculum Change, Care and Justice in Public Education in New York
Alfred Sneyd (Waikato University)	MHD excitation of oscillations in liquid-metal pools
Sina Greenwood	Charactersing continuous functions on Lindelöf spaces
Scott Parkins (Department of Physics, The University of Auckland)	Quantum Chaos with Ultra-Cold Atoms
Shixiao Wang	Vortex breakdown: How Mathematics can help to find the new mechanism in Physics
Carlo Laing (IIMS, Massey University at Albany)	Mode locking in a periodically forced ``ghostbursting'' neuron
Bruce Richter (University of Waterloo, Canada)	Characterizing uniquely embeddable subsets of the sphere
Ivan Reilly and Jiling Cao	Conference reports
Rua Murray (University of Waikato)	A convex optimization approach to invariant measures
Bart Oldeman	The saddle-node Hopf bifurcation with global reinjection.
Krasimira Tsaneva-Atanasova	Synchronisation of Calcium Oscillations in a Pancreatic Acinus
Sam Ferreira (Research Fellow, Department of Statistics, The University of Auckland)	Metapopulations: Scaling African conservation challenges
Jessica Utts (University of California)	Investigating Psychic Phenomena with Statistics
Jessica Utts (Department of Statistics, University of California Davis)	Principles and Practices for Teaching Statistics
Brian van Dam	A Thesis Resolved: Resolutions, their properties and use towards manifolds and Dowker spaces.
Peter Nyikos (University of South Carolina)	A strong separation property
Peter Nyikos (University of South Carolina)	What does "random" mean?
Peter Nyikos (University of South Carolina)	Cardinal restrictions on some homogeneous compacta
Peter Nyikos (University of South Carolina)	Elbow room in Hilbert space and other Banach spaces
Simon Marshall (The University of Auckland)	Rankings of Multisets and Discrete Cones
Peter Nyikos (University of South Carolina)	Spaces of continuous functions on subsets of the real line
Chris Triggs (Department of Statistics)	Probability and Statistics in Forensic Science
Nodira Khoussainova (The University of Auckland)	Determinization of Buchi-Automata: Safra's Construction
Tran, Thanh Tam (The University of Auckland, MSc Statistics Student)	Pricing Electricity Derivative Using Price Duration Curve
Boris Pavlov	Analytic perturbation theory on continuous spectrum revisited: Intermediate operator (observation on the Friedrichs model)
David Gauld	An introduction to convergence spaces
Marston Conder	Compact hyperbolic 4-manifolds of small volume
Jozef Siran	Regular maps on nonorientable surfaces
Paul Fong (University of Illinois (Chicago))	Dade's conjecture for finite reductive groups
Richard Lundgren (University of Colorado at Denver)	Variations on Interval Graphs
Kirsi Peltonen (Helsinki University of Technology)	Finsler Geometry: Convenient framework for applications containing infinitesimal Banach space structure
Ray Hoare (Hoare Research Software, Hamilton)	Presentation of Statistica software package
V.S. Sunder (Institute of Mathematical Sciences, Madras (India))	Subfactors and 1+1-dimensional TQFTs, part 2

V.S. Sunder (Institute of Mathematical Sciences, Madras (India))	Subfactors and 1+1-dimensional TQFTs, part 1
Shan-I Lee (The University of Auckland)	Calculating the Alexander polynomial from the Dowker sequence.
Jiling Cao	Barely Baire spaces and a problem of McCoy
Anna Bogolmonaia (Rice University)	A new solution to the random assignment problem
Richard S Laugesen (University of Illinois, Urbana-Champaign)	How to say "subsolution" with the maximum principle
Colin Aitken, Professor of Forensic Statistics (Department of Mathematics and Statistics, University of Edinburgh)	Evaluation of forensic trace evidence in the form of multivariate data
Douglas Lind (University of Washington (Seattle))	A Gentle Introduction to Algebraic Dynamics
Herve Moulin (Rice University)	Cooperative game theory: the Shapley value
Michael Bulmer (Department of Mathematics, University of Queensland)	Virtual Worlds for Teaching Mathematics and Statistics
Mark Maunder (Inter-American Tropical Tuna Commission, La Jolla, USA)	Ecological Modelling: Information and Uncertainty
Robert Raphael (Concordia University)	A functor on Tychonof spaces.
Kevin Wang (Dept. of Statistics)	Effects of Cell-phone Towers on Housing Prices
Ruhama Even (Weizmann Institute)	The Preparation of Providers of Professional Development for Teachers of Mathematics
Grant Woods (University of Manitoba)	Using group "research projects" in the teaching of introductory calculus
John Chambers (Bell Labs)	Current Research in Statistical Computing – first of five in a series
Valentin Gutev (University of KwaZulu-Natal, South Africa)	Selections and their applications
Grant Woods (University of Manitoba)	Cozero-complemented spaces
M.F. Newman (Australian National University)	Classifying p-groups by coclass
Mark Clements (National Centre for Epidemiology and Population Health, Australian National Univ)	Prediction of Lung Cancer Mortality using Generalized Additive Models and Bayesian Age-Period-Cohort Models
Eric Grinberg (University of New Hampshire)	Tomography over finite fields
Bettina Eick (University of Braunschweig)	Classifying p-groups by coclass
Christine Hunter (Woods Hole Oceanographic Institution, Woods Hole, MA, USA)	Simplifying construction and analysis of multi-regional population models using the vec-permutation matrix
Hershel Farkas (The Hebrew University)	Theta Functions: Conformal Mapping through Combinatorial Number Theory
Heinz Bauschke (Mathematics and Statistics, University of Guelph)	Hundal's alternating projections counterexample and the proximal point algorithm
Herve Moulin (Rice University)	The random allocation of indivisible units: an axiomatic approach
Antonio Terlizzi Ph.D., (Dept. of Biological and Environmental Science and Technologies Univ of Lecce)	Scales of spatial variation, environmental impacts and experimental designs. An overview from Mediterannean rocky subtidal
Charles Eaton (UMIST)	Local determination in block theory
Jonathan Reeves (School of Banking and Finance, University of New South Wales)	Structural Breaks in Realized Volatility
Susan Pitts (Cambridge)	Estimation for risk models
Hal Caswell (Biology Dept.Woods Hole Oceanographic Institution, USA)	Stochastic demography of a threatened floodplain plant

Ken Brewer (School of Finance and Applied Statistics, Australian National University)	Combined Survey Inference: Compromise or Consummation?
Tsukasa Yashiro (Osaka City University)	On some invariants of knots and surface-knots
Zbigniew Piotrowski (Youngstown State University)	Quasi-continuity, Baire 1 and separate continuity of functions
Mike Thomas	Mathematics Learning and Brain Scans

Research Grants

MARSDEN GRANTS

Grantee	Amount	Title
M. D.E. Conder, J. An & E. A. O'Brien	52000	Effective computational approaches to questions in group theory and its applications
J. C. Butcher, A. Heard	100000	Efficient General Linear Methods for Ordinary Differential Equations
M.Meylan, V.Squire, D.Evans, R. Porter, S. Sakai	30000	Wave Scattering in the MIZ
J. Cao and W.Moors	255000	Analytic Topology and its Applications
J. An, M.D.E. Conder and E.A. O'Brien	170533	Group actions, representations, structure and algorithms
J. Sneyd	610000	Modelling the cardiac calcium transient on multiple spatial scales
M. Jones and G.Nicholls	99000	Archaeological patterns in space and time
J. Siran, M.D.E. Conder, P. Bonnington	110000	Algebraic and structural graph theory

OTHER EXTERNAL GRANTS

Grantee	Amount	Title	Funding Body
E.A. O'Brien	4000	Periodicity and coclass	Alexander von Humboldt Foundation
T. Branson, M. Eastwood, A.R. Gover, Wang	80000	Conformal structure in geometry, analysis, and physics	American Institute of Mathematics, and the US NSF
M.D.E. Conder, V. Jones, et al	1835000	NZIMA - Centre of Research Excellence in the Mathematical Sciences	Centres of Research Excellence Fund
J. Moller and G.Nicholls	22500	Perfect simulation	MaPhySto (Denmark)
C. Fox	13800	Bayesian Methods in Inverse Problems	Finnish Mathematical Society
S. Taylor, S. Wang, New Zealand Steel	90000	Mathematical Modelling of an Annealing Furnace	Foundation for Research, Science and Technology
E.A. O'Brien	4000	Conjugacy classes and p-groups	INdAM (Italy)
M.D.E Conder	5000	Auckland-Dijon cooperation	ISAT Linkages (RSNZ)
G. Nicholls	4800	Mathematical genetics	LMS - Oxford University
M. Pfannkuch	17700	Statistics Education Literature Review	Ministry of Education
M. Thomas	158355	Technology Use in NCEA Mathematics	NZCER (TLRI)
D. Gauld, V. Jones and R. Fenn	393000	Geometric Methods in the Topology of 3-Dimensional Manifolds	NZIMA

A. R. Gover, Scott, Visser, Wiltshire	5000	Black Holes in Astrophysics, General Relativity, and Quantum Gravity	NZIMA
A. R. Gover	120000	Invariants in analysis and geometry	NZIMA (Maclaurin Fellowship)
V. Kirk, M.McGuinness, R.McLachlan, R.Murray, R. Quispel	22500	Additional funding for thematic programme on Dynamical Systems and Numerical Analysis	NZIMA
A. Slinko	5000	Small grant to invite Prof. Bossert	NZIMA
P. Bonnington and G.Whittle	325000	Combinatorics and Its Applications	NZIMA
M. Thomas	2172	Travel Grant	Texas Instruments
E.A. O'Brien	3000	Classification of p-groups	UK EPSERC

UNIVERSITY OF AUCKLAND STAFF RESEARCH GRANTS

P.W. Sharp	2500	The migration of Uranus and Neptune
A. Slinko	3000	Additive representation of preferences on Cartesian products
S. Taylor, P. Boyd (Chemistry)	3000	Distinguished Visitor Award - Peter Gill/Computational Quantum Mechanics
H. Bartholomew	9650	The development of students' identities as learners of mathematics
W.B. Moors	2050	Analytic Topology
B. Barton	800	The mathematics of learners using minority languages (research preparation)
B. Pavlov	3500	Modelling of quantum networks
E.A. O'Brien	5000	Identification of groups of lie type
E.A. O'Brien	110000	Effective algorithmic approaches to the construction and classification of finite soluble groups – University of Auckland Post-doctoral award
A. R. Gover, J. Silhan	2000	An algorithm for constructing conformal and CR invariant operators
M.D.E. Conder	20000	Hood Fellowship
H. Bartholomew	12500	Students' identities

VI. STAFF LEAVE AND CONFERENCES

Name	Conference Name	Papers Delivered
D. Alcorn	VIC 2004, VUW, February NZMRI Summer Workshop, Nelson January	
H. Bartholomew	MERGA June, Townsville	Equity and Empowerment in Mathematics: some tensions from the secondary classroom
W. Barton	International Congress of Mathematics Education, July, Copenhagen	Undergraduate Mathematics Learning in English by Speakers of other Languages
W. Barton	Mathematics Education Research Group Australasia, June, Townsville	Mathematical Discourse of Advanced Undergraduate Mathematics
P. Bonnington	NZIMA Workshop on Combinatorics July	Organiser

	NZIMA Conference in Combinatorics December	Organiser
J. Cao	19th "Summer" Conference on Topology and its Applications, Cape Town, July	Volterra properties and the ideal of boundary Fsigma sets
J. Cao	Topology and Analysis in Applications, Didima, South Africa, July	Non-Baire Vietoris hyperspaces
R. Chan	27th Mathematics Education Research Group Conference, June, Townsville: James Cook University	
	10th International Congress of Mathematics Education, Copenhagen, July	
	University of Auckland Showcase	The Mathematical Discourse of Advanced Undergraduate Mathematics
	NZ Mathematics Colloquium, December, Dunedin	
M. D. E. Conder	International Conference on Group Theory and Algebraic Combinatorics (Beijing)	Symmetries of Cayley graphs and graphs underlying regular maps
	NZIMA Workshop on Combinatorics Auckland, July	
	Conference on Discrete Groups & Hyperbolic Manifolds, Aberdeen, August	
	Workshop on Three-Dimensional Geometry & Topology, Oxford, August	
	NZIMA Workshop on Dynamical Systems & Numerical Analysis, Raglan, September	
	Workshop on Optimisation & Transportation Scheduling, Whakapapa, September	
	2004 NZ Mathematics Colloquium, Dunedin, December	Group actions on hyperbolic 3-manifolds
	Symposium for David Gauld, Auckland, December	Highly transitive imprimitivities
	NZIMA Conference on Combinatorics, Taupo, December	Symmetries of Cayley graphs and graphs underlying regular maps
	NZMRI summer meeting on Computational Algebra & Number Theory, Nelson, January	
	Workshop on Game Theory and Social Choice, Auckland, February	
	Victoria International Conference, Wellington, February	
	Alexander von Humboldt Foundation Colloquium, Auckland, February	
C. Fox	Perspectives in Inverse Problems, Helsinki, June	Computing statistical solutions to physical inverse problems

D. Gauld	19th "Summer" Conference on Topology and its Applications, Cape Town, July	Analytic=Continuous
	Devonport Topology Festival, Devonport, February	Knots
	Topology and Analysis in Applications, Didima, South Africa, July	Conditions equivalent to metrisability for a manifold
	New Zealand Mathematics Colloquium, Dunedin, December	Analytic=Continuous
	NZMRI Workshop, Nelson, January	
	VIC 2004, VUW, February	Function spaces and metristability of manifolds
A. R. Gover	9th International conference on Differential Geometry and its Applications, August-September, Prague	Session plenary talk
	American Mathematical Society sectional meeting at Rider University, April	Invited speaker
	Geometric and analytic problems related to Cartan connections, Erwin Schroedinger International Institute for Mathematical Physics(Vienna), April	Invited participant at workshop
	24th Winter School on Geometry and Physics, Srni, Czech Republic. (Series of three lectures.) January.	Invited Plenary lecturer
	NZ Mathematics Colloquium, University of Otago, December.	Invited Plenary speaker
	Geometric Partial differential equations at the Institute for Mathematical Sciences, Singapore, May - June	Invited speaker and participant at the workshop
	Conformal Geometry, at the Banff International Research Station, Canada, July- August	Invited speaker and participant at the workshop
S. Greenwood	Devonport Topology Festival, Devonport, February	Characterizing Continuous Functions on Lindelof Spaces
	Pasifika Symposium, Waikato, August	
	New Zealand Mathematics Colloquium, Dunedin, December	Brunnian links
	ATEC, Auckland, September	
P. Hafner	The 2004 NZIMA Conference in Combinatorics and its Applications, Taupo, December	From the Steiner system S(2,5,21) to S(5,8,24) via the Higman-Sims graph
M. Harmer	VIC 2004, VUW, February	Spectral Properties of the Triangle Groups
	Devonport Topology Festival, Devonport, February	Spectral Properties of the Triangle Groups
	Recent Perspectives in Random Matrix Theory and Number Theory	
	Quantum Chaos and Number Theory	
	Matrix Ensembles and L-functions	
J. Holt	Colloquium at Emory University	The Topology of the space of hyperbolic structures on a 3-manifold
	AMS Sectional meeting, University of Southern California	On the topology of the space of punctured-torus groups
	University of Chicago	Bumping of exotic projective structures

	Conference on Hyperbolic Geometry and Geometric Analysis, Wesleyan University	Non-accumulation of deformation spaces
	Stanford University	On the topology of the space of punctured-torus groups
A. Heard	Computational PDE-ODE Conference, Auckland	Application of Control Theory to Time-stepping Algorithms
	NZ Mathematics Colloquium, Dunedin, December	
V. Kirk	NZIMA Conference on Dynamical Systems and Numerical Analysis, Raglan, September	
	NZIMA Workshop on Dynamical Systems and Numerical Analysis, Leigh, December	
H. McKenzie	Merga 27 Townsville Australia, June	
A. McNaughton	David Ryan's 60th birthday conference [Chateau Tongariro]	Forest Harvesting with Area Restrictions on Clearfell
	ORSNZ, Auckland, November	Recent Progress on the area restriction problem of forest harvesting
	Mathematics Colloquium, Dunedin, December	Optimization of Forest Harvesting
B. Miller-Reilly	Fourth Annual Conference of NZ Association of Bridging Educators, September	
G. Nicholls	InCoB Auckland bioinformatics meeting	Measureably evolving memes
	London Mathematical Society, Durham Symposium in Mathematical Genetics	Language evolution + 3 PhD student papers
	McDonald Institute Meeting on Language, Cambridge, UK	Dating Indo-European phylogenetics
	Inverse problems workshop, Kuopio Finland, June	Statistical methods for Inverse problems
E. A. O'Brien	Finite geometries, groups and computation, Colorado, September	Constructive recognition for linear groups
	German Mathematical Society Special Session on computational algebra	Effective algorithms for linear groups
G. Oates	Contemporaray Approaches to Research in Mathematics, Science, & Health Education	An Instrument for a Holistic Comparison of Curricula and Technology Use
	Asian Technology Conference in Mathematics (ATCM), Singapore, December	Measuring the Degree of Technology Use inTertiary Mathematics Courses
	MERGA 27, June, Townsville	Integration or Incorporation? An Examination of the Use of Technology in Tertiary Mathematics Courses
B. Oldeman	NZIMA workshop in Leigh, December	Homoclinic and Hopf bifurcations for travelling wave solutions in calcium models
	NZIMA workshop in Raglan, September	Numerical continuation of defects
S. Parnell	27TH Annual Conference of the MERGA, Townsville, June	

	3rd Annual Conference of the NZ Bridging Educators.	Hands Feet and Other Body Parts.
M. Pfannkuch	10th International Congress in Mathematics Education, Copenhagen, July	Comparison of data plots: the need to build a pedagogical framework
	International Association of Statistics Education Roundtable Conference, Sweden, July	Developing statistical thinking in a secondary school: A collaborative curriculum development.
	LOGOS#14 Seminar Day, November, Auckland	
I. Reilly	Italian/Spanish conference on Topology and its Applications	Language and Topology
	NZ Mathematics Colloquium, Dunedin, December	
P. Sharp	ANZIAM Computational Techniques and Applications conference	Brouwer's law: optimal multistep integrators for celestial mechanics; Brouwer's law: long integrations and chaos
	Dynamical Systems and Numerical Analysis, Raglan, September	Horseshoe orbits for the elliptic restricted three-body problem
J. Siran	6th Winter Combinatorial Day, Open University, UK, January	Regular maps on surfaces of negative Euler characteristic
	Cezch and Slovak conference in graph theory, Slovakia, May	Transitive maps - invited lecture
	Workshop in topological design theory, Slovakia, June	Surface embeddings of Steiner triple systems - invited talk
	Workshop in combinatorics, Univ. of Auckland, July	Three invited lectures on transitive maps on surfaces
	International workshop in graph labellings, Indonesia, December	Graceful labellings of paths and the Map Colour Theorem - invited lecture
A. Slinko	Mathematical Modelling of Social and Economical Dynamics (MMSED-2004), Moscow	Comparing the rules Chamberlin's way
	VII International Meeting of the Society for Social Choice and Welfare	On the average minimum size of manipulating coalition
	Symposium in honour of David Gauld, December	Optimal lobbying is w[2]-complete
	Workshop on Economic Decisions, Pamplona (Spain)	Relative uncertainty aversion and additively representable set rankings
	Game Theory and Social Choice, Auckland, February	Orders on sets and multisets, discrete cones and Fishburn's conjecture
D. Smith	NZMRI Summer Meeting, Nelson, January	
J. Sneyd	New Zealand Mathematics Colloquium, Dunedin, December	Plenary lecture
	Society for Mathematical Biology, Ann Arbor	Plenary lecture
M. Statham	Third Annual Conference of NZ Bridging Educators.	Hands, Feet and Other Body Parts
	Merga(27), Townsville, June	
S. Taylor	MISG, Auckland, January	Moderator

	New Zealand Mathematics Colloquium, Dunedin, December	Strip Temperature in an Annealing Furnace
G. Tee	NZ Mathematics Colloquium, Dunedin, December	Surface area of ellipsoids in n dimensions
M. Thomas	PME Bergen Norway	Integrating CAS Calculators into Mathematics Learning: Issues of Partnership
	ICMI 10 Copenhagen Denmark, July	Regular lecture on Representation and learning; Discussion group paper on calculus learning
S. Waldron	VIC 2004, Wellington, February	Special session organiser
S. Wang	MISG 2004, Auckland, January Workshop on numerical methods of ODE and PDE April Workshop on Dynamical systems and numerical analysis, December	

VII. COMMUNITY SERVICE

Mr David Alcorn: Chairperson and Acting Treasurer of the New Zealand Journal of Mathematics Committee.

Dr Hannah Bartholomew: Teacher development in decile 1 and 2 Manukau schools.

Dr Paul Bonnington: Chief Managing Editor of the Australasian Journal of Combinatorics (2001-), President for Combinatorial Society of Australasia.

Assoc Prof Bruce Calvert: Member of the Nonlinear Circuits and Systems Committee of the IEEE.

Prof Marston Conder: Co-director and Treasurer of NZ Mathematical Research Institute, Member and President-elect of RSNZ Academy, Member of RSNZ Council (from November 2004), Member of Performance-based Research Funding (PBRF) Sector Reference Group, Member of Marsden Fund Council and Convenor of its Mathematical and Information Sciences Panel, Member of Top Achiever Doctoral Scholarships Advisory Committee, Member of Sector Expert Group for Tertiary Funding Category Review, Member Grafton Hall Board.

Dr Colin Fox: Organiser of POAC'05 18th International Conference on Port and Ocean Engineering Under Arctic Conditions Potsdam, New York, USA, June 26 – 30, 2005.

Dr Allison Heard: Secretary/Treasurer of NZ Branch of ANZIAM.

Mr John Holt: Co-organised (with I. Agol and S. Schleimer) a special session in Kleinian groups and low-dimensional geometry at the AMS regional meeting, Norwestern University, October 23-24, 2004

Mr Viliami Latu: Implemented the "Home School of Mathemaics" for younger Pacific Island students form primary level to fourth form at secondary level, Member of the Tonga College old boys executive group, Columnist for "Taimi 'o Tonga" newspaper, "Le'o 'o e Matematika pe ko e Fika" or "The Voice of Mathematics".

Dr Alastair McNaughton: Council Member, Operational Research Society of New Zealand.

Ms Barbara Miller-Reilly: One of the main New Zealand contacts for the Australasian Bridging Mathematics Network, New Zealand agent for the European Organisation Adults Learning.

Mr Garry Nathan: Member of the Ministry of Education Numeracy Reference Group, Member of the Adult Numeracy Learner Progressions Development Group (Tertiary Education Commission/Ministry of

Education), Member of Best Evidence Synthesis (Mathematics/Pangarau) Advisory Group (Ministry of Education).

Mr Greg Oates: Assisted with Mathematics Olympiad Auckland Region Competition.

Mrs Sheena Parnell: Writing National Scholarship examinations for NZQA, Moderate MIT mathematics examinations.

Mrs Judy Paterson: Discussion with principals, senior teachers on employment of teacher trainees.

Dr Maxine Pfannkuch: Gave half day workshop to Auckland teachers and pre-service teachers on developing students' statistical thinking, on the Ministry of Education Mathematics Curriculum Reference Group, Writer for the 2006 new school statistics curriculum, Gave a workshop on statistical literacy aspects to the Ministry of Education Data Analysis and Management Division in Wellington, Met with Statistics New Zealand people in Wellington to discuss statistics education in New Zealand, IASE national correspondent – write a regular column for the NZ Statistics Association newsletter, ICOTS-7 Topic convenor, ICME-10 Top group committee, NZSA education committee, on International Advisory Committee for Statistical Reasoning, Thinking and Literacy Forums.

Prof Ivan Reilly: (Foundation) Chair of the NZ Mathematical Olympiad Committee since 1986, (Foundation) Chair of the NZ Mathematical Enrichment Trust since 1999, continues to act as NZ Liaison Officer under NZVCC auspices of the University of California Education Abroad Program.

Dr Arkadii Slinko: Continuing Leader of New Zealand Mathematical Olympiad Team and Training Director of NZMOC, helped to film a documentary about the six members of the team that will be screened by TVNZ, Organised Auckland's Mathematics Olympiad.

Dr David Smith: NZ Math Olympiad Summer Camp Tutor (Christchurch, January 2004), NZ Mathematical Olympiad Training Camp Tutor (Auckland, July 2004).

Mrs Moira Statham: Member of the newly established Board of Foundation Studies for AUT.

Assoc Prof Michael Thomas: Member of the Executive of the Auckland Mathematics Association, Editor of the New Zealand Mathematics Magazine, National Scholarship examiner and marking panel leader.

VIII. OTHER MATTERS

Staffing

The following academic staff were successful in their applications for promotion:

Dr Roderick Gover	to Associate Professor
Dr Vivien Kirk	to Senior Lecturer
Dr Michael Meylan	to Senior Lecturer
Dr Warren Moors	to Senior Lecturer
Ms Judith Paterson	over Senior Tutor bar
Ms Wendy Stratton	over Senior Tutor bar

Awards

Assoc Prof Eamonn O'Brien	NZ Mathematical Society Research Award
The Department	University for Excellence in Equal Opportunities

Department Administration

Many staff members have made substantial contributions to the effective administration of the Department. Thanks are especially due to all the general staff and to the following staff for taking on key responsibilities in the Department:

Deputy Head of Department	Mr David Alcorn
Departmental Committee	Mr David Alcorn, Assoc. Prof. Bill Barton, Prof.

	Marston Conder, Prof David Gauld, Dr Rod Gover, Dr Paul Hafner, Dr Vivien Kirk, Ms Daniela Rovere
Department Staffing Advisory Committee	Assoc. Prof. Bill Barton, Prof. David Gauld, Prof. Gaven Martin, Assoc. Prof. Eamonn O'Brien, Dr Maxine Pfannkuch, Prof. James Sneyd
Research and Postgraduate Committee	Prof. Marston Conder, Dr Rod Gover, Dr Sina Greenwood, Dr Philip Sharp, Prof. James Sneyd, Assoc. Prof. Mike Thomas, Dr Shayne Waldron
Computer Committee	Dr Paul Bonnington, Dr David McIntyre, Assoc. Prof. Eamonn O'Brien, Dr Philip Sharp, Assoc. Prof. Mike Thomas
Publicity Committee	Mr Chris King, Ms Min-Young Lee, Ms Daniela Rovere, Dr David Smith, Dr Steve Taylor
Academic Staff Performance Reviewers	Prof. David Gauld Prof. Boris Pavlov, Prof. Ivan Reilly, Prof. James Sneyd
Head of Applied Mathematics Unit	Prof. James Sneyd
Head of Mathematics Education Unit	Assoc. Prof. Bill Barton
Head of Tamaki Mathematics Group	Dr Robert Chan
Directors of Graduate Studies PhD	Dr Sina Greenwood, Dr Shayne Waldron
Director of Graduate Studies Masters and Postgraduate Diploma	Mr David Alcorn, Dr Rod Gover, Dr Philip Sharp
Teaching Coordinator	Dr Paul Hafner
Research Coordinator	Prof. Marston Conder
BTech (Industrial Mathematics) Coordinator	Dr Steve Taylor
Enrolment Coordinator	Mr David Alcorn
Timetable Administrator	Mr David Alcorn
Examination Coordinator	Mr David Alcorn
Examinations Results Processing	Dr David McIntyre
Publicity Officer	Mr Chris King
Regulations/Handbooks	Dr David Smith
EEO/EEdO Representative	Dr Sina Greenwood
NZ Mathematical Society Correspondent	Dr Garry Tee
Webmaster	Dr Shayne Waldron
Overseas Students & Ad Eundum Admissions	Mr David Alcorn
Library Liaison Officer	Mr David Alcorn
Convenor of Staff/Student Liaison Committee	Mr Greg Oates
Summer Research Scholarships Coordinator	Dr Vivien Kirk
Organiser of the Undergraduate Laboratories	Dr Allison Heard
Markers Coordinator	Mr Roy Swenson
Markers Coordinator (Tamaki)	Dr Alastair McNaughton
Department Research Report Series	Ms Olita Moala
Safety Officer	Ms Daniela Rovere
Seminars: Algebra, Geometry & Combinatorics Analysis Applied, Computational & Industrial Mathematics Topology Department Colloquia MESS (Mathematics Education) GRID (Mathematics Education)	 Assoc. Prof. Eamonn O'Brien Dr Shayne Waldron Dr Philip Sharp Dr Sina Greenwood Assoc. Prof. Eamonn O'Brien Dr Hannah Bartholomew, Ms Barbara Miller-Reilly Dr Maxine Pfannkuch
Faculty Representatives: Arts Business and Commerce Engineering	 Mr David Alcorn Dr Joel Schiff Assoc. Prof. Bruce Calvert
Ethics Advisor	Assoc Prof Mike Thomas

University Committees:

Mr David Alcorn: Library Liaison Officer, Member of Science Group Library Committee, Science Faculty subprofessorial representative on Senate, Member of Arts Faculty Board of Undergraduate Studies.

Dr Paul Bonnington: Associate Dean (IT) Faculty of Science, Chair – Faculty of Science IT Committee (Academic), Chair – Working Group University IT Strategy and Policy Committee, University Web Governance Board, University IT Faculties Forum, Sub-professorial representative on the University Administration Review Committee

Assoc. Prof. Bill Barton: Faculty of Science Chair of Foundation Studies.

Assoc. Prof. Bruce Calvert: Member of Science Faculty EO Committee, Member of Teaching and Learning Committee of Senate.

Dr Robert Chan: Head of Tamaki Mathematics Group, Associate Coordinator for Tamaki Open Day, Representative at Tamaki Faculty of Science meetings.

Prof. Marston Conder: Chair of the University of Auckland Budget Committee, Member of Vice-Chancellor's Advisory Group, Member of the Capital and Budget Planning Committee, Member of Governing Board of Centre for Molecular Biodiscovery, Chair of Bioeningeering Institute's Advisory Board.

Dr Colin Fox: Head of the Acoustics Research Centre.

Prof. David Gauld: Member of Faculty of Science Staff Advisory Committee, member of PBRF Internal Grading Panel, member of University Academic Staff Committee.

Dr Sina Greenwood: Member of the Steering Committee to formulate a proposal to form a Pacific Institute, Member of the Tuakana network, Faculty of Science EO Committee representative.

Dr Paul Hafner: Member of Lecture Theatre Advisory Board, member of CULT Monitoring Group.

Dr David McIntyre: Member of the University of Auckland Information Technology Faculties Forum, Science Faculty IT Committee.

Dr Geoff Nicholls: Member of the University of Auckland Bioinformatics Institute.

Mr Greg Oates: Member of Student Affairs Working Group looking at Student Representation.

Assoc. Prof. Eamonn O'Brien: Faculty of Science IT Committee, Sub-professorial representative for Faculty of Science on Senate.

Prof. Ivan Reilly: Member of the University Education Committee, Board of Studies in Education, Board of Foundation Studies.

Dr Wiremu Solomon: Faculty of Science Maori and Pasifika Committee, Faculty of Science EO Committee.

Ms Wendy Stratton: Member of the University Year 13 Studies Committee.

Assoc Prof Mike Thomas: Member of the Science Faculty Undergraduate Staff Student Consultative Committee.

New Zealand Journal of Mathematics

The New Zealand Journal of Mathematics is jointly produced by the Department and the New Zealand Mathematical Society. Apart from the prestige of producing such a journal a major advantage for the University is the number of international journals which the University receives in exchange for the New

Zealand Journal of Mathematics. The Editorial staff consists of Prof. Gaven Martin (Editor), Dr Joel Schiff (Executive Editor), Dr Jianbei An (Associate Editor), Ms Min-Young Lee (Editorial Assistant), and Ms Betty Fong (Production Assistant). Members of the Department who have served on the Editorial Board are Professors John Butcher, Marston Conder, David Gauld, Vaughan Jones and Gaven Martin and the Department's representatives on the Management Committee are Mr David Alcorn (who is also convenor of the Committee) and Prof. Ivan Reilly.

Maintaining Teaching Quality

The Department takes seriously its commitment to quality teaching. Apart from individual staff taking responsibility for their teaching the Department uses three further ways to monitor and improve its quality:

i. Systematic and regular student evaluations of both courses and teachers following a schedule determined by the Head of Department and the Teaching Coordinator.
ii. Teaching workshops held about twice a year. At these workshops staff members share and discuss ideas which have been found to work well in the classroom.
iii. Three teaching advisors, experienced and very capable teachers, have been available to attend lectures given by other staff. Usually they provide a written report as well as a verbal follow-up. One advantage is that the Advisors, through observing a range of teaching styles, are able to pick up and pass on quickly good teaching ideas.

IX. OVERALL COMMENTS

Having been Head of Department for 14 of the past 24 years it may be in order for me to reflect on developments within the Department over this time in this, my last, Annual Report.

When I was first appointed Head in 1981, the Department had a semi-autonomous Statistics Unit, the Applied Mathematics Unit having been disestablished the previous year with the establishment of the Computer Science Department and transfer of most of the Applied Mathematics staff to Computer Science. A year later the Department was renamed Mathematics and Statistics and that name was used until the splitting of the Department into two components in 1994. The present Department of Mathematics has two semi-autonomous units, in Applied Mathematics and in Mathematics Education. The former was re-established in 1988, following recommendations made in the 1987 review of the Department and the latter in 1993.

Comparative statistics showing changes in some important measures are revealing. To smooth out fluctuations from year to year I show averages over a three year period with the first figure covering the years 1980-2 and the second 2002-4.

- Equivalent full-time students: 600, 910;
- Permanent Academic staff: 27, 37;
- Research publications: 27, 80;
- Seminars by visitors: 20, 87;
- General staff: 6, 6;

Short term Academic staff numbers have more or less increased by the same proportion as permanent staff.

From the figures in the last paragraph it is clear that the current staff, both Academic and General, are more productive than those in the early 1980s. I do not believe this is because the staff in the 1980s were working below par; instead the current staff are working well above par.

Looking beyond the figures above, in 1981 the bulk of the Academic staff had been with the Department about ten years and were aged close to 40. Those staff are now near to retiring; indeed some have already either retired or plan to in the near future. With the Department's student numbers expanding from the late 1980s, staff numbers increased in the early 1990s to give the Department a better profile of experience. Most of the staff appointed during that period of expansion remain. Following the departure in the late 1990s of staff mostly appointed in the 1960s, the Department has had a further wave of new appointments over the past three years. Across the whole Department we have a good spread of experience and this may be expected to be maintained as further staff retire.

Further expected retirements over the next few years need to be managed to maintain the health of the Department. A recent phenomenon which was not expected is the departure of three younger, very productive staff; one has moved to Massey University, one has returned to the United States of America and the third will go soon to the University of Oxford. This has had an unsettling effect on remaining staff and, given that two of those resigning are analysts and several recent retirees were also analysts, there is particular concern for the important field of Mathematical Analysis.

General staff numbers have remained about the same but the work they do has changed significantly. The effect of this is most notable for the Head of Department. Having a desktop computer helps me in my job but I think that I could have been a much more effective Head if I had not had to spend maybe three hours every day reading my computer screen and typing into it. I did none of that in 1981. It is pleasing to note that the Faculty has, after three years of requests from me, at last approved the appointment of a new general staff member, a major part of whose work is to help the Head of Department in precisely this way : for me this has come too late.

The student profile has also changed significantly. As noted above, considerably more than half of our student population is now of Asian origins and almost half of them are paying the full non-resident fee. We are noticing that many students are having difficulty with their English comprehension and for several ethnic groups we are trying to alleviate this problem by offering tutorials and other support by tutors fluent in the relevant languages or at least from the ethnic group.

Another noticeable change in the student population is the level of their preparation in Mathematics. It is good for the country that a larger proportion of the age cohort is now undertaking advanced secondary and tertiary education, but an inevitable effect is the reduction of the content of courses so that they satisfy the needs of the broader population. While we have modified our courses a number of times to satisfy the needs of these students, I think that it is still true that the very best of our students are very good and we continue to offer these students challenging courses.

Another feature of the current student population is the number of PhD students and post-doctoral fellows. In 1981 the Department had no PhD students but it did have two post-doctoral fellows. Now the Department has typically 20 – 25 PhD students and we currently have six post-doctoral fellows.

A long-lasting lament has been the Department's difficulty in mounting small group tutorials. In my first Annual Report, for 1981, I observed the impossibility of any tutorials because of the lack of suitable rooms. This theme recurred throughout the 1980s and it was not until the University took on board recommendations from the 1987 Review Committee that I was able to report more optimism in 1989. Even so, reconfiguration of space did not allow for the growth and the problem persists despite efforts on the part of both the Department and the Faculty. Thus, the 1998 Review Committee repeated the concerns about tutorials expressed by their 1987 predecessors. For 2005 we expect to be able to mount a full set of tutorials because the Faculty has been allocated two tutorial rooms in the Chemistry Building. However, there seems to be no guarantee that these rooms will continue to be available for our use for tutorials.

It is with relief that I step down from the Headship for the last time. I look forward to being able to devote uninterrupted time to many neglected research projects.

David Gauld
Professor and Head of the Department of Mathematics 19 January 2004