DEPARTMENT OF MATHEMATICS

ANNUAL REPORT 2000

PREAMBLE

The Department of Mathematics comprises over 70 established and temporary academic staff, based on two sites (the City campus and Tamaki campus), and with the number of its equivalent full-time students totaling approximately 960 in 2000 the Department is one of the largest at the University of Auckland, offering courses at all levels for students in several Faculties.

The Department has a sub-unit which operates with a minor degree of autonomy: the Mathematics Education Unit. Also staff have been actively involved in the Acoustics Research Centre, the Centre for Discrete Mathematics and Theoretical Computer Science, and the Mathematical Biology Research Unit. The Department has particular research strengths in many different areas of mathematics including algebra, combinatorics, complex analysis (one and several variables), differential equations and mathematical modelling, functional analysis and operator theory, history of mathematics, mathematics education, numerical analysis, topology and geometry. The department is the strongest department nationally, publishing almost as much research in the last five years as all other mathematics departments in NZ combined (Math. Review Citation).

Highlights for the Department in 2000 include the presentation of the gold medal from the Latvian Mathematical Society to Arkadii Slinko for his work with the International Mathematics Olympiad, the Distinguished Teaching Award in the Faculty of Science to Barbara Miller-Reilly, promotion of Norm Levenberg to Associate Professor, two Fulbright awards to two of our top students (John Duncan and Caroline Yoon), Will Wright gaining a Bright Futures Scholarship, two of our recent PhDs (Sina Greenwood and Abdul Mohammed) being awarded NZ Science and Technology Postdoctoral Fellowships, and our Distinguished Alumni Professor VFR Jones chosen as a "Golden Kiwi" by National Radio. There were invitations to many of our staff to present plenary addresses at major international conferences. We successfully organized and ran no fewer than 4 international conferences. Another important highlight was the involvement of the Mathematics Education Unit, and in particular Bill Barton, in the mounting of the $2 million project in Manukau Schools, which arose from a scoping study and is now part of the University's Partnership Appeal.

A major blow to the Department this year was the loss of Margaret Morton, who died on August 28 from complications associated with cancer. Margaret was deeply involved in many aspects of the department's day to day running and has yet to be adequately replaced. A conference was held at the University of Auckland in mid-December on Algebraic and Topological Methods in Graph Theory, and the organisers decided to dedicate that conference to Margaret, and to hold a half-day special session in her honour. A report on this conference is given below.

Also this year Mohan Chinnappan left us, taking a position in Wollongong University. His responsibilities, primarily within the MEU, were covered by a variety of short term appointments and shuffled teaching duties.

I. DEVELOPMENTS IN TEACHING

The Department of Mathematics provides teaching in papers for students in several faculties, notably Arts, Engineering, Science and Business & Economics.

For the 2000 academic year, student numbers totaled approximately 960 effective full-time students (EFTS), including 900 undergraduate EFTS (800 on the City campus and 100 at Tamaki), and just over 60 postgraduate EFTS. These numbers have stabilised to some extent in the last two years, following considerable increases in earlier years, and it is particularly pleasing that the significant growth in our postgraduate enrolments over recent years has been maintained. We anticipate approximately a similar number of EFTS in 2001. Numbers at Tamaki have fallen. Until a clear plan for the future development of Tamaki is presented, the Department remains unsure of how to proceed there, and we must live with potential volatility in student numbers.

This year was the first year that the Department was involved in the teaching of 415.225 with the Computer Science Department. This joint initiative proved very successful this year and offers potential for future collaboration. Similar initiatives with the Physics Department were planned during this year and will be in place for 2001. This involves a suite of special courses in mathematics for students in the experimental sciences. It will be jointly taught between Mathematics, Physics and Chemistry.

Because of resourcing issues, which have partly motivated the aforementioned developments, we find that we are unable to meet the learning needs of a large number of our students (in terms of tutorial assistance and computer laboratories), or to offer scholarships and other support to research students competitive with those offered elsewhere. Our facilities are over-crowded and cannot be made available to all students in need. Urgent improvement is required, to enable the Department to provide a high quality environment for teaching and learning for both undergraduate and postgraduate students, and to maintain the high profile it has established in research. Moreover, the fact that the majority of the undergraduate students in the Department receive most of their mathematics learning in large tiered lecture theatres is contrary to the findings of educational research which shows that smaller class size improves educational outcomes. The Department has one of the lowest pass rates in the University. We believe this aspect of our performance is crucially dependent on being given the resources to offer a comprehensive tutorial scheme. This particular problem was specifically addressed in the review in 1998 with the recommendation "The Department of Mathematics give high priority to providing space and staffing resources to support a programme of small group tutorials (of no more than 30 students in each group) for all large enrolment papers (i.e. with 100 students or more) at Stages 1 and 2, and that a Coordinator be appointed for the tutorial programme and all aspects of assistance in the large Stage 1 and 2 papers". The Department has made moves to address these issues, largely by redirecting salary savings. This cannot persist into the future, we need to make a number of senior appointments and we will need funding to continue these developments. This year saw the establishment of the department's Learning Centre - directed by Greg Oates which will be increasing the small-group tutorial assistance available to students at 100-level, and aims to support teaching, assignments, marking, etc for all 100-level courses.

Dr David McIntyre continues to upgrade his very useful and efficient computer-based system for processing examination results (enabling cross-comparisons and monitoring of pass rates and so forth). This system is constantly being refined and is a wonderful assessment tool. The Department's handling and processing of exams is very efficient and we cannot understand why we must be burdened with the University's archaic centralised examination system. Again, this year the Head of Department had to personally sign off on about 6000 grades. Moreover, considerable time and resources are now spent copying and returning scripts. The Department dealt with nearly 1000 such requests this year, representing approximately $2000 simply in paper charges which must be borne by the Department. This does not count the approximately 100 hours of secretarial time, nor the postage costs.

At the beginning of 1997 the Department initiated a revolving three-yearly cyclic review of the papers we offer. The first grouping of papers, considered in 1997, were the core Stage 1 and 2 papers 445.151, 445.152, 445.162, 445.251, 445.252 and 445.260, and teams reviewed the remaining Stage 1 and 2 papers in 1998. In 2000 the stage 3 course reviews progressed slowly as we considered the effect and success of earlier reviews, particularly of the Stage 2 papers.

The paper 445.230 (Advanced Mathematics 2) will be reintroduced from the year 2001 as we try to meet some of the needs of our stronger students.

MEU: The Mathematics Education Unit (MEU) is continuing to strengthen its involvement in teacher training and mathematics education. In the teaching area highlights included the new Masters papers in `Mathematics Curriculum' and `Mathematics & Learning', and the highly successful secondary teacher education programme.

The Royal Society Fellows for the year 2000 were

Karyn Woodruffe from Pakuranga College
Rosheen Gray from Senior College of NZ
Kerry Spooner from Northcote College

And for next year we have Nicole Roper (Diocesan School).

The Teaching Fellow for 2000 was Martine McGregor-Reid from St Cuthbert's.
And for next year we have David Godfrey (Selwyn College) and Mark Phillips (Mcleans College)

Additionally we have a number of Teacher Researchers working on the Maths Enhancement Project (called "Stepping Stones" by Faculty of Science). They are Jessie Autagavaia (Lynfield College) and Albert Poleki (Massey High School). The Mathematics Enhancement Project will work in two schools: Mangere College and Otahuhu College as the start of a five-year $2 million project to bring through students from senior classes in decile 1 and 2 schools into mathematical courses in tertiary institutions. This project is part of the university's Appeal.

Another notable innovation is the STAR programme - a version of 152 for the top students in Auckland secondary schools while they are still in their final year of school. Ivan Reilly is managing this for the Mathematics Department.

One of the most successful international Mathematics Education Conferences run in the southern hemisphere was the TIME 2000 conference organised here at the University of Auckland jointly with AUT's Applied Math. Department. Mike Thomas was the co-convenor. There were about 215 people from a number of countries, including UK, USA, Canada, Germany, Japan, Singapore, Hong Kong, Finland, Sweden, Australia, and New Zealand. Notable names who were here included the following (those marked with a * would rank in the top 10 in the world for Technology in Maths Ed. Jim Kaput, the world leading expert, was unable to come at the last due to a death in the family. He has a paper in the proceedings however.)

*Prof Celia Hoyles, London Institute of Education, UK
*Prof Richard Noss, London Institute of Education, UK
Prof Claude, Gaulin, Laval University, Quebec City, PQ, Canada
Prof Neville, Davies, Nottingham Trent University, Nottingham, UK
*Prof Kaye, Stacey, The University of Melbourne, Melbourne, Australia
*Prof Richard Lesh, Purdue University, Indiana, USA
*Prof David Tall, Warwick University, UK
Prof Tilak, De Alwis Southeastern Louisiana University, Hammond, LA, USA
A/Prof John, Olive, The University of Georgia, Athens, GA, USA
Dr Barry Sloane, National Science Foundation, USA.
Barry Kissane, Murdoch University, Murdoch, WA
Pam Bishop, Birmingham University, UK

Wellesley Programme: This year ninety eight students were enrolled in Wellesley Programme mathematics. As in previous years, all students were taught the Basic Course 445.091 and a top stream of students was offered the additional Extension Course 445.092. The enrolment was mixed in ethnicity (39 Pakeha, 14 Maori, 30 Pacific Island and 15 of Other origin), and in gender (39 male to 59 female). The students were divided into four streams with each having five hours teaching per week. In addition the tutors were available to help students individually as required. The pastoral care component was considerably greater this year when the programme was functioning without a secretary who had traditionally been the first point of call for students in trouble. Sixty six students (67%) completed the course and sat the Mathematics exam. Students completed the programme in about this same proportion irrespective of their gender or chosen course, but in terms of ethnicity, while Pacific Island students stayed the distance (73% completed), Maori students were significantly less successful (36% completed). However, although only five Maori students completed the year, they did well in Mathematics where four scored A- or better in 445.091, and were placed 7th, 10th, 11th and 12th. Overall, 80% of completing students passed the basic mathematics course.

This year the Wellesley Programme relaxed entry criteria to include seventh form students who had not scored sufficient marks in Bursary examinations to gain entry to university. Some of these students had taken mathematics at seventh form level, but none had passed in calculus or statistics. These particular students showed high marks in the interview test assessing basic numeracy, problem solving skills, and algebra. They were placed in the extension mathematics group, where it was found that they did not necessarily know all the work. Five sat the final examination gaining grades of B+, B. B-. C and D. They were not the top students in the class, they did not by any means have a complete grasp of all the work, and three of them took the year rather casually, being content to 'pass'. It will be a challenge in the future to design a course that balances the needs of two very different groups : to fill in gaps for school leavers with borderline bursary marks, (acknowledging that their grasp of much of the material is tenuous), while at the same time catering for the traditional market of students who have poor backgrounds, but who are potentially able and have a serious intent to learn.

The Wellesley Programme still offers full year papers only. Under the auspices of the newly formed Board of Foundation Studies, it appears that the programme will be re-vamped in 2002 as a 'Certificate in Foundation Studies' for which CUAP approval will be sought. The new Certificate is likely to have a 7 point per semester format, and will include a compulsory 2 points in Mathematics, with the option of 4 points being desirable for Science students and all enthusiastic others. Mathematics will need to be offered at two levels (basic and extension) in each semester, to meet the needs of a changing intake.

A highlight of the year was the Wellesley Programme graduation ceremony, held on November 29th at the Wharekai. The Chancellor, Mr John Graham, and the Vice-Chancellor Dr. John Hood presented the certificates, and the awards to the top students. The Department of Mathematics was represented by the Head of Department, Professor Gaven Martin, and also by Professor Ivan Reilly, Dr Bill Barton, Mrs Judy Paterson and Mr Greg Oates from MEU. The evening was capped by a moving presentation of a series of vignettes from a group of six ex-Wellesley Programme students : a lawyer, a second year medical student, a PhD student in Marine Biology, an Occupational Therapist, a graduate in Planning, and a fourth year student in Psychology.

This year there were two graduates in Mathematics among the sixteen ex-Wellesley Programme students who graduated from the University of Auckland.

During the year the Department continued with its initiatives to improve teaching resources, consistency of the standard of core papers, and the interface with students. Information summaries for the majority of papers are posted on Departmental web pages, to facilitate ready access by both staff and students. Folders containing study guides, assignments and solutions, tests and final examinations for each paper are available in the Mathematics Education Unit's library/archive in the Department (and also databanks of lecture notes, past assignments etc. are available for some papers on disc). Recent historical information is particularly helpful to staff members who are unfamiliar with the contents and standard of a paper.

Summer School: The department had an unanticipated and very heavy demand for the new summer school course 445.208. Despite a predicted enrolment of about 50-70 students in this course, the final enrolment was 223. There continues to be strong demand for 445.108 during summer, with enrolment of 171. It appears that there is further room for growth here and the Department will teach another introductory course (445.102) over summer. As at the time of writing enrollment in 208 has further increased in 2001 to in excess of 300.

Close scrutiny continues to be given to two of the most important interfaces with students, namely the Department's Assistance Room, and the marking of assignments. Both of these facilities have been reviewed to try to ensure a consistent standard and to provide those tutors and markers involved with the appropriate training and support. During the year three workshops were held for student tutors working in the Assistance Room, and these students were also encouraged to attend workshops offered by the Center for Professional Development and to obtain the CPD Tutoring Certificate. A `Mentoring Guide' and also a `Tutoring Guide' have been produced for the department giving guidance and imparting the department's expectations to the large number of students we haire on a casual basis for marking and tutorial.

II. OTHER STUDENT MATTERS

Scholarships and Prizes

Senior Scholarship in Applied Mathematics	Kelsey Grant
Senior Scholarship in Mathematics	Kevin Bleakley
	Richard Vale
Annual Prize in Applied Mathematics	Stuart Laurence
Annual Prize in Pure Mathematics	David Robinson
Collins Prize in Mathematics	Irene Peng
	David Robinson
Montgomery Memorial Prize	Lucja Kot
Mathematics Education Prize	Michael Loretz

Summer Scholarships

Some 25 students were engaged in research projects over the summer 1999/00, with scholarship support from the Department. Some took part in the Mathematics Summer Workshop in Computation and Complexity in January, while others assisted staff with computational or practical aspects of individual research projects, or in the preparation of papers and other resource materials. This programme of summer scholarships has proved invaluable to both students and staff and we hope to continue to be able to offer it in the future.

Student/Staff Liaison Committee

A Student/Staff Liaison Committee Chaired by Greg Oates (comprised of staff and student representatives from all levels) met informally four times in the year, providing a successful means of two-way communication between students and staff in the Department on matters of common concern such as course and degree structures, and more general issues such as tutorial facilities and course assessment.

III. EEO & EEdO

The Mathematics Department and its staff are strongly in favour of principles of Equal Employment Opportunity (EEO) and Equal Educational Opportunity (EedO) and have acted accordingly. Over recent decades the actions and decisions made by the Department have been made with concern for the spirit of EEO and EEdO, and often initiatives have been taken specifically to deal with EEO and EEdO issues.

Over the years, staff in the Mathematics Department have continued independently to evolve means by which disadvantaged groups can be helped. For example: Dr Bill Barton has organised summer language schools for many students with limited knowledge and skills in English; Dr Wiremu Solomon continues to run individual and group tutorials for Maori students (often sent to them by the Student Learning Centre or Nga Tauira Puaho); and Drs Liao Ke-Cheng and Jianbei An have offered Mathematics tutorials in Mandarin (and also Cantonese and Huk Ga) to students of Chinese origin. These tutorials will continue into 2000; Dr. Sina Greenwood organised a similar tutorial for Pacific island students this year, we have moved to strengthen this aspect of our teaching commitment by hiring Dr Greenwood on a 3-year Postdoctoral position. Sina has since won a prestigious NZS&T Postdoctoral Fellowship, but will continue her involvement on behalf of the Department in our Maori and Pacific Island Student (MAPIS) initiatives. This year we opened our MAPIS room, jointly run with the Statistics department, and our first Aldis Scholarships were awarded; an outreach programme for the top Mathematics Students in decile 1 & 2 Schools in the Auckland region, run by Wiremu Solomon and Sina Greenwood. Despite several hurdles to overcome and a great deal of effort by those involved, this programme seems to be off to a good start and a full report on this will be in the next annual report.

The Department continues to run courses at foundation levels to meet the needs of students whose background in mathematics is weak. These include the Wellesley Programme and papers 445.101 Mathematics 1 and 445.102 Mathematics 2, complemented by the work of some staff through the Student Learning Centre and the Centre for Continuing Education.

We have attempted to encourage more female students to study mathematics, with some success: the percentages of women in 2000 were 57.8% in the Wellesley and predegree programmes, 36.9% at Stage 1, 35.5% at Stage 2, 35.9% at stage 3, and 38% at Masters level (cf. percentages in the mid 20s fifteen years ago). These figures are from the Director of Planning (August 2000). In recent years some members of the Department have made visits to schools to encourage students into mathematics, particularly students from under-represented groups, and offered short courses for the math anxious. Also many EEdO issues have been discussed in our courses in Maths Education.

More recently the Mathematics Department (in conjunction with the Departments of Computer Science, Engineering Science, Statistics and Physics) has supported open days for female high school students, sponsored visiting speakers on the subject of encouraging students to follow careers in the mathematical sciences and computing, and held seminars on multi-cultural mathematics issues. Many of these initiatives have been continued by the Liaison Officer for Women in Physical Sciences and Engineering, whose appointment was strongly supported by our Department.

Some of our intervention programmes have been more successful than others, and the search continues to find a range of helpful interventions. Also a recent suggestion has been made to help deal with students who do not understand English well, by monitoring tests and exams to find if/how they can be understood better.

Efforts are made in the assistance room and computer labs to have a balance of tutors with regard to gender and ethnicity. In addition to running courses for students without much background in mathematics, the Department offers advanced courses for more able or more qualified students, to meet their needs. The principle of giving students every opportunity has shown itself also in concern for individuals as well as groups of people: for example long ago the Department introduced an assessment formula by which a student's final mark for a course can be taken as the better of their exam mark and a combination of their exam and coursework marks. The Department runs assistance rooms, computer labs and some tutorials, and all staff have office hours, to assist those who need help to learn.

The issue of EEO has been faced mainly by trying to appoint female academic staff where possible. This has nearly always been achieved through personal contacts, although positions have all been advertised in the Bulletin of the Association of Women Mathematicians. There have been women on the permanent staff of the Department since the fifties, but not continuously, and very few. We still have only 2.5 FTE women in a total of 37.5 FTE established academic staff (now 1.5 with Dr Morton's death). Our women academics are involved in selecting new staff.

Temporary staff are a target group for EEO. Temporary tutors involved in the Wellesley programme say they have been treated very well by the Department, now after facing the uncertainty of a 1-year while the programme was under review, have accepted 3 year contracts. Another target group is general staff. Our secretary/typists have a copy of the report by general staff on EEO and support its findings, and also endorse the Department's stated need for more programming and technical staff support, for example to provide a consolidated programme of in-service training in the use of computer systems.

Many staff with heavy family responsibilities find the support of colleagues and the environment of the department helpful, for example in matters of timetabling lectures or parental leave. Staff with illnesses and temporary disabilities have been treated most considerately.

The Department takes the issue of Maori staff seriously. We have one academic staff member who is Maori and one Pasifika. We have PhD students with Maori and Pasifika ancestry. It should be noted that we often take it for granted that staff of the Department form an international group with various religions and ancestry and first languages.

IV. RESEARCH

1. GENERAL/HIGHLIGHTS

The Department of Mathematics has a very strong research programme, with several of its staff among the world leaders in their fields, and attracts a large number of visitors each year as well as an increasing number of postgraduate students and significant research awards and funding. In 2000 more than 25 plenary lectures were given by our staff at international conferences. Twelve staff were involved as principal or associate investigators in successful grant applications to the Marsden Fund — of the 90 or so Marsden Fund grants awarded to the University of Auckland staff so far, 13 have been awarded to members of the Mathematics Department, reflecting the very high international standing it enjoys in research.

The Mathematics Education Unit was awarded research grants from both the Ministry of Education and the NZ Qualifications Authority, and continues with a British Council funded research exchange program.

A highlight for the year was the running of the international conference in Algebraic and Topological Methods In Graph Theory, ATMGT2000 December 11-15, a report of which follows.

ATMGT2000, a conference on algebraic and topological methods in graph theory was hosted by the Department of Mathematics, Univerity of Auckland, December 11-15, 2000. This was the first conference in, what is hoped to be, a series of graph theory conferences timed to occur around the middle of the four-year Slovene graph theory conference cycle. The organisers were particularly pleased that many Slovenes managed to participate in this
Auckland conference.

The invited speakers were:

* Bruce Richter, University of Waterloo, Canada
* Joan Hutchinson, Macalester College, St Paul, Minnesota
* Dragan Marusic, University of Ljubljana, Slovenia
* Tomaz Pisanski, University of Ljubljana, Slovenia
* Cheryl Praeger, University of Western Australia, Perth, Australia
* Jozef Siran, Slovak Technical University, Bratislava, Slovakia
* Robin Thomas, Georgia Institute of Technology, Atlanta, Georgia
* Tom Tucker, Colgate University, Hamilton, New York
* Mark Watkins, Syracuse University, New York

Dr Margaret Morton was instrumental in the organisation of this conference. Margaret passed away on August 31, aged only 55, after a short battle with cancer. The organisers decided to dedicate the conference to Margaret, and to hold a half-day special session on the Tuesday in her honour. The speakers during this session included collaborators and colleagues: Joan Hutchinson, Cheryl Praeger, Marston Conder, Neal Brand and Paul Bonnington.

The social events included a Monday night reception in "Old Government House", on the University grounds, and an excursion (on a glorious sunny day) to the vineyards and beaches of Waiheke Island in the Hauraki Gulf. (However, we understand that many theorems were proved during this excursion while sitting on Oneroa Beach, and therefore whether it qualifies as a "social" event is debatable.) The conference dinner was a very popular kiwi-style BBQ held at Dianne and Gaven Martin's home situated in an area of beautiful native bush (complete with glow-worms) north of Auckland.

A total of 50 people from New Zealand, Australia, Slovenia, Canada, United States, Iran, Mexico, South Africa, Slovakia, and the Sultanate of Oman registered for the conference. From all reports, the participants thoroughly enjoyed the conference, and had a stimulating week of mathematics!

The organisers wish to thank the Department of Mathematics (University of Auckland), the Marsden fund (administed by the Royal Society of New Zealand) and the Centre of Discrete Mathematics and Theoretical Computer Science (University of Auckland) for their generous financial support of the conference.

PUBLICATIONS

(a) Refereed Journal Articles

AN, J. and EATON, C.[4] 'The p-local rank of a block', *Journal of Group Theory*, 3, 369-380, 2000.

AN, J. and SHI, W.[3] 'The characterisation of finite simple groups with no elements of order 6', *Communications in Algebra*, 28, 3351-3358, 2000.

AN, J. and O'BRIEN, E. 'The Alperin and Dade conjectures for the Fischer simple group Fi_{23}', *International Journal of Algebra and Computation*, 9, 621-670, 1999.

ANDERSON, G.D., QIU, S.L., VAMANAMURTHY, M.K. and VUORINEN, M. 'Generalised Elliptic Integrals and Modular Equations', *Pacific Journal of Mathematics*, 192(1), 1-37, 2000.

BAILEY, T.N.\/.,[3] EASTWOOD, M.G.\/.,[3] GOVER, A.R. and MASON, L.J.[3] 'The Funk Transform as a Penrose Transform', *Math. Proc. Cam. Phil. Soc.*, 125, 67-81, 1999.

BONNINGTON, C.P., GRIGGS, T.[3], GRANNELL, M.[3], and SIRAN, J.[3] 'Exponential families on non-isomorphic triangulations of complete graphs', *J. Combin. Theory Ser. B.*, 78, 169-184.

BOOTH[5] , R. D. L. and THOMAS, M. O. J. 'Visualisation in Mathematics Learning: Arithmetic problem-solving and student difficulties', *Journal of Mathematical Behavior*, 18(2), 169–190, 2000.

BUTCHER, J.C., Numerical methods for ordinary differential equations in the 20th century, *Journal of Computational and Applied Mathematics*, 125 (2000), 1-29.

BUTCHER, J.C. and CHAN, T.M.H. 'Multi-step zero approximations for stepsize control', *Applied Numerical Mathematics*, 34, 167-1777, 2000.

BUTCHER, J.C., CHARTIER, P. and JACKIEWICZ, Z. 'Experiments with a variable-order type 1 DIMSIM code', *Numerical Algorithms*, 22, 237-261, 1999.

BUTCHER, J.C. and CHEN, D.J.L. 'A new type of singly-implicit Runge-Kutta method', *Applied Numerical Mathematics*, 34, 179-188, 2000.

BUTCHER, J.C. and SINGH, A.D. 'The choice of parameters in parallel general linear methods for stiff problems', *Applied Numerical Mathematics*, 34, 59-84, 2000.

CALVERT, B. D., Linear systems in a saturated mode and convergence as gain becomes large of asymptotically stable equilibrium points of neural nets. *Circuits Systems Signal Process.* 18 (1999), no. 3, 241-267

CALVERT, B. D., ZEMANIAN, A. H., Operating points in infinite nonlinear networks approximated by finite networks. *Trans. Amer. Math. Soc.* 352 (2000), no. 2, 753—780.

CAO, J., GANSTER, M. and REILLY, I. 'On sg-closed sets and g-alpha-closed sets'. *Memoirs of the Faculty of Science, Kochi University, Series A Mathematics* 20 (1999) , 1-5.

CAO, J., MOORS, W. and REILLY, I. 'On the Choquet-Dolecki Theorem'. *Journal of Mathematical Analysis and Applications* 234 (1999), 1-5.

CAO, J., GANSTER, M. and REILLY, I. 'Submaximality,extremal disconnectedness and generalized open sets'. *Houston Journal of Mathematics* 24 (1998), 681-688.

CHAN, R.P.K. and CHARTIER, P. 'Classification of high-order implicit Runge-Kutta methods', *N.Z.J.M.* 29(2), 151-167, 2000.

CHAN, R.P.K. and MURUA, A. 'Extrapolation of symplectic methods for Hamiltonian problems', *Appl. Numer. Math.* 34, 189-205, 2000.

CHOU, LIN-YI, SHARP, P.W. 'Order 5 symplectic explicit Runge-Kutta Nystrom methods', *Journal of Applied Mathematics and Decision Sciences, in press.*

CLUNIE, J.[3], RAHMAN, Q.I.[3] and WALKER, W.J. 'On Entire Functions of Exponential Type Bounded on the Real Axis', *Journal of the London Mathematical Society* 61(2), 163-176, 2000.

CONDER, M.D.E., LI, CAI HENG, and PRAEGER, C.E. 'On a conjecture of Richard Weiss', *Proceedings of the Edinburgh Math. Society,* 43, 129–138, 2000.

DIKSHIT, G.D. 'Absolute Nevanlinna Summability and Fourier series', *Journal of Mathematical Analysis and Applications*, volume 248, 482-408, 2000.

FOX, C., NICHOLLS, G. and PALM, M. 'Efficient solution of boundary-value problems for image reconstruction via sampling'. *Journal of Electronic Imaging* 9(3), 251-259 (July 2000).

GAULD, D. 'Covering Properties and Metrisation of Manifolds', *Topology Proceedings*, 23, 127-140, 1998.

GAULD, D. and GREENWOOD, S. 'Microbundles, Manifolds and Metrisability', *Proceedings of the American Mathematical Society*, 128, 2801-2807, 2000.

GOVER, A.R. and SLOVAK, J.[3] 'Invariant Local Twistor Calculus for Quaternionic Structures and Related Geometries'. *Journal of Geometry and Phys.* 32, 14-56, 1999.

GOVER, A.R., ZHANG, R.[3] 'Geometry of Quantum Homogeneous Bundles and Representation Theory of Quantum Groups'. *Rev. in Math. Phys.* 11 533--552, 1999.

GRAHAM[3], A. T. and THOMAS, M. O. J. 'Building a Versatile Understanding of Algebraic Variables with a Graphic Calculator', *Educational Studies in Mathematics*, 41(3), 265–82, 2000.

HONG[5], Y. Y., THOMAS, M. O. J. and KIERNAN[5], C. 'Super-Calculators and University Entrance Calculus Examinations', *Mathematics Education Research Journal*, Special Issue December 2000, in print.

HORRING, J., PATERSON, J. and BARTON, B. 'Thinking about teacher effectiveness: How do teacher appraisers make 'gut feeling' evaluations?' *Mathematics Teacher Education & Development*, 1(1), 2000.

JIANG, S., REILLY, I. and WANG, S. 'Some properties of theta-closed spaces', *Topology and its Applications* 96 (1999), 23-29.

JONES, VFR. and BISCH, D., 'Singly generated planar algebras of small dimension.' *Duke Math. J.* 101 (2000),, 41-75

JONES, VFR. *Ten problems. Mathematics: frontiers and perspectives*, 79-91, Amer. Math. Soc., Providence, RI, 2000. 57-02

MARTIN, G., MACLAUGHLAN, C. and MCKENZIE, J. 'Cocompact Kleinian Groups with Quadratic Invariant Trace Field', *Journal of the New Zealand Mathematical Society*, Dec 2000.

MARTIN, G., ASTALA, K, IWANIEC, T. and KOSKELA, P. ' Mappings of BMO-bounded distortion **II'** *Math. Annalen,* **317** (2000), 703-726.

MARTIN, G., On quasicoformally homogeneous compacta, *Studii si cercetari mat.* vol.2 (51), **4** (2000).

MARTIN, G., BARGMANN, D., BONK, M., HINKANNEN, A. 'Families of meromorphic functions avoiding continuous functions' *Journal d'Analyse Math.* **79** (1999), 379-387.

MCNAUGHTON, A.J. 'The Locus of the Zeros of a rational Function under fractional Differentiation', *Journal of Fractional Calculus* vol 16 , 55 - 66, 1999.

O'BRIEN, E.A. and FLANNERY, D. 'Computing 2-cocycles for central extensions and relative difference sets', *Communications in Algebra* 28, 1939-1955, 2000.

PAVLOV, B. and KURASOV, P., *Few-body Krein's Formula*, Operator
Theory: Advances and Applications, Vol. 118, Birkhaeuser Verlag, Basel, 2000, 225-254

PFANNKUCH, M. and WILD, C. 'Statistical Thinking and Statistical Practice: Themes Gleaned from Professional Statisticians'. *Statistical Science* 15(2), 132-152, 2000.

TALL[3], D. O., THOMAS, M. O. J., DAVIS[3], G., GRAY[3], E. and SIMPSON[3], A. 'What is the Object of the Encapsulation of a Process?' *Journal of Mathematical Behavior*, 18(2), 223–241, 2000.

TAYLOR, S.W. 'A smoothing property of a hyperbolic system and boundary controllability', *Journal of Computational and Applied Mathematics (114) (1)* 23-40, 2000.

TEE, G. J. 'Bounds for eigenvalues of positive-definite band matrices', *Australian Mathematical Society Gazette*, 27, 155-157, 2000

WALKER, W.J. 'The Arithmetic Fourier Transform and the Visual Pathway', *Applicable Analysis* 76(1-2), 167-177, 2000.

(b) Sections in Books

MCNAUGHTON, A.J., RONNQVIST, M. and RYAN, D. 'A Model which Integrates Strategic and Tactical Aspects of Forest Harvesting', *System Modelling and Optimisation*, Editors M.J.D. Powell and S. Scholtes, Kluwer Academic Publishers, Boston, 189 - 208, 2000.

MILLER-REILLY, B.J. 'Exploration And Modelling In A University Mathematics Paper: Perceptions Of Adult Students.' In *Perspectives on Adults Learning Mathematics: Research and Practice*, D. Coben, J. O'Donoghue, G. FitzSimons (eds.), Kluwer Academic Publishers, 257-270, 2000.

PAVLOV, B. and KURASOV, P., *Operator relation and Scattering matrix* Operator Theory: Advances and Applications, **113** ed. Nikolskij Complex Analysis, Operators and Related Topics, S.A.Vinogradov - in memoriam}, Birkhauser Verlag, Basel,2000, pp 294-305.

SLINKO, A. and KHOUSSAINOV, B. 'Computable Rings, Groups and Their Isomorphisms.' In *Nonassociative Algebra and Its Applications*, Eds. R. Costa etc., Marcel Dekker, NY, 397-416, 2000.

(c) Books

BARTON, B. (Ed.) *Communication & Language in Mathematics Education: The Pre-Conference Publication of Working Group 9 ICME9,* Auckland: Mathematics Education Unit, Department of Mathematics, The University of Auckland, 2000.

THOMAS, M. O. J. (Ed.) *Proceedings of TIME 2000 an International Conference on Technology in Mathematics Education,* Auckland, New Zealand, 1–288, 2000

(d) Papers in Refereed Conference Proceedings

CAP, A.[3] and GOVER, A.R. 'Tractor Bundles for Irreducible Parabolic Geometries', *Societe Mathematique de France, Seminaires et Congres, Numero 4*, 127-152, 2000.

CHINNAPPAN[1], M. and THOMAS, M. O. J. 'Function Representations and Technology Enhanced Teaching', *Proceedings of the 23rd Mathematics Education Research Group of Australasia Conference*, Perth, 172–179, 2000.

FOX, C. 'Scaling laws for flexural waves in floating ice', *Proceedings of IUTAM: Scaling Laws in Ice Mechanics and Ice Dynamics, J.P. Dempsey, H.H. Shen, L.H. Shapiro (eds) University of Alaska Fairbanks, June 13-16*, 2000.

FOX, C. and NICHOLLS, G. 'Exact MAP states and expectations from perfect sampling: Grieg Porteous and Seheult revisited', *MAXENT2000, Gif-sur-Yvette, August,* 2000.

GOVER, A.R. 'Aspects of Parabolic Invariant Theory'. *Supp. Rend. Circ. Matem. Palermo, Ser. II, Suppl.* 59, 25-47, 1999.

GRAHAM[3], A. T. and THOMAS, M. O. J. 'A graphic calculator approach to understanding algebraic variables', In M. O. J. Thomas (Ed.*) Proceedings of TIME 2000 an International Conference on Technology in Mathematics Education, Auckland, New Zealand,* 137–144, 2000.

HOLTON, D., CLARK, M., MILLER-REILLY, B.J., REILLY, I. and RENAUD, P. 'Diversity in New Zealand'. *In W. Spunde, P. Cretchley & R. Hubbard (eds) Proceedings of Delta'99 Symposium on Undergraduate Mathematics Education, University of Southern Queensland, Australia*, 248-253, 1999.

HONG[5], Y. Y. and THOMAS, M. O. J. 'Super–calculators and conceptual understanding of the Newton–Raphson method', In M. O. J. Thomas (Ed.) *Proceedings of TIME 2000 an International Conference on Technology in Mathematics Education, Auckland, New Zealand,* 163–171, 2000.

HONG[5], Y. Y., THOMAS, M. O. J. and KWON[3], O. 'Understanding Linear Algebraic Equations via Super–calculator Representations', *Proceedings of the 24th Conference of the International Group for the Psychology of Mathematics Education, Hiroshima, Japan,* 3, 57–64, 2000.

LIYANAGE[5], S. IRWIN[2], K., & THOMAS, M. O. J. 'A Framework for Informal Assessment By Secondary School Mathematics Teachers', *Proceedings of the 23rd Mathematics Education Research Group of Australasia Conference, Perth*, 377–384, 2000.

PAVLOV, B. and MICHKAILOVA, B., The Quantum Domain as a triadic relay
Proceeding of the Second International Conference on Unconventional Models Calculations, (UMC'2K), 13-16 Dec. 2000, Brussels,I. Antoniou, C.S.Calude and M.J.Dinneen (Eds), Springer, 2000, pp 167-186.

PFANNKUCH, M. 'A model for the promotion of statistical thinking.' *Mathematics education beyond 2000. Proceedings of the 23rd Annual Conference of the Mathematics Education Research Group of Australasia. Fremantle, Western Australia, 5-9 July,* 503-510. 2000.

PFANNKUCH, M. 'The perceptions and practice of assessment in mathematics education of teachers of Year 3 and Year 6 students.' *Mathematics education beyond 2000. Proceedings of the 23rd Annual Conference of the Mathematics Education Research Group of Australasia, Fremantle, Western Australia, 5-9 July*, 511-518, 2000,

(e) Reviews and Comments

AN, J.: Entz, G. and Pahalings, H. *The Dade conjecture for the McLaughlin group* from *London Math. Soc. Lecture Note Ser. 260.* Review in *Mathematical Reviews* 2000h:20023, 2000.

AN, J.: Watanabe, A. *The Glauberman character correspondence and perfect isometries for blocks of finite groups*, from *Journal of Algebra.* Review in *Mathematical Reviews*, 2000f:20015, 2000.

CONDER, M.D.E.: Gardiner, A., Nedela, R., Sirán, J. and Skoviera, M. *Characterisation of graphs which underlie regular maps on closed surfaces.* Review in *Mathematical Reviews* 2000a: 05104, 2000.

CONDER, M.D.E.: Lucchini, A. and Tamburini, M.C. *Classical groups of large rank as Hurwitz groups*. Review in *Mathematical Reviews* 2000f: 20080, 2000.

CONDER, M.D.E.: Lucchini, A. *(2, 3, k)-generated groups of large rank*. Review in *Mathematical Reviews* 2000i: 20077, 2000.

CONDER, M.D.E.: Martin, B.M.S. *Restrictions of representations of a surface group to a pair of free subgroups.* Review in *Mathematical Reviews* 2000k: 57006, 2000.

CONDER, M.D.E.: Lucchini, A., Tamburini, M.C. & Wilson, J.S. *Hurwitz groups of large rank.* Review in *Mathematical Reviews* 2000m: 20074, 2000.

DIKSHIT, G.D.: Bernard Beauzamy, *How the roots of a polynomial vary with its coefficients: A local quantitative result*, Review in *Zentralblatt Mathematik*

DIKSHIT, G.D.: B.L. Chalmers, D. Leviatan, and M.P. Prophet, *Optimal interpolating spaces preserving shape*, Review in *Zentralblatt fur Mathematik*

DIKSHIT, G.D.: B. Beauzamy, *On the paths to the zeros of a polynomial*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: A. Turkmenoglu, *Matrix transformation between some classes of double sequences*, Review in *Zentralblatt für Mathematik*.

DIKSHIT, G.D.: H. N. Mhaskar, F J Narcowich and J D Ward, *Approximation properties of zonal function networks using scattered data on the sphere*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: S. D. Riemenschneider and N Shivakumar, *Gaussian radial-basis functions: Cardinal interpolation of lp and power- growth data*, Review in *Zentralblatt Mathematik.*

DIKSHIT, G.D.: B. Bojanov and A. Sri Ranga, *Some examples of moment preserving approximation*, Review in *ZentralblattMathematik.*

DIKSHIT, G.D.: M. Unser and T. Blu, *Fractional splines and wavelets*, Review in *Zentralblatt Mathematik*.

DIKSHIT, G.D.: M. Gorzenska, M. Lesniewicz and C. Pretki, *Approximation of functions of several variables in exponential weighted spaces*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: A. B. Pevnyi, *On the interpolation by discrete splines with equidistant nodes*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: A. L. Gonzalez and R. A. Zalik, *Density and approximation properties of Markov systems*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: K. Boroczky Jr., *Polytopal approximation bounding the number of k-faces*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: S. P. Zhou, *On monotone rational approximation: A new approach*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: X.-J. Li, *On zeros of defining functions for some Hilbert spaces of polynomials*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: M. L. Mittal and B. E. Rhoades, *Degree of approximation to functions in a normed space*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: M. S. Floater and T. Lyche, *Asymptotic convergence of degree-raising*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: N. N. Andreev and V. A. Yudin, *Problems of approximation theory in Discrete Geometry*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: M. S. Floater and .J. M, *Pena Monotonicity preservation on triangles*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: R. Q. Jia, *Interpolatory subdivision schemes induced by box splines*, Review in *Zentralblatt für Mathematik.*

DIKSHIT, G.D.: S. Waldron, *Minimally supported error representations and approximation by the constants*, Review in *Zentralblatt für Mathematik.*

GAULD, D.: Gruenhage, G. and Lutzer, D., *Baire and Volterra spaces*, in *Zentralblatt Math* 947.54018, 2000.

GAULD, D.: de la Llave, R. and Obaya, R., *Decomposition theorems for groups of diffeomorphisms in the sphere*, in *Zentralblatt Math* 937.58011 2000.

GAULD, D.: Bates, P.W., Lu, K. and Zeng, C., *Persistence of overflowing manifolds for semiflow*, in *Zentralblatt Math* 947.37009 2000.

GAULD, D.: Herald, Christopher M., *Chern-Simons gauge theory on 3-manifolds*, in *Zentralblatt Math* 944.57015 2000.

GAULD, D.: Shimomura, H., *Unitary representations and 1-cocycles on the group of diffeomorphisms*, in *Zentralblatt Math* 943.22018 2000.

GAULD, D.: Weiping, L., *Singular connections and Riemann theta functions*, in *Zentralblatt Math* 937.58012 2000.

GAULD, D.: Smolyanov, O.G., *Differential measures on groups of current'*, in *Zentralblatt Math* 933.58012 2000.

GAULD, D.: Eichhorn, J., *Diffeomorphism groups on noncompact manifolds*, in *Zentralblatt Math* 930.58007 2000.

GAULD, D.: Hughes, B. *Stratified path spaces and fibrations*, in *Zentralblatt Math* 923.55007 2000.

GAULD, D.: Takahashi, W., *Existence theorems in metric spaces and characterizations of metric completeness*, *Mathematical Reviews*, 2000d:54046, 2000

O'BRIEN, E.A.: Sanders, P.J., *The coexponent of a regular p-group, Comm. Algebra* 28(2000), No. 3, 1309-1333, 2000m:20026, 2000.

O'BRIEN, E.A.: Beals, R., *Algorithms for matrix groups and the Tits alternative, 36th IEEE Symposium on the Foundations of Computer Science (Milwaukee, WI, 1995), J. Comput. System Sci*. 58(1999), No. 2, 260-279, 2000h:20094, 2000.

O'BRIEN, E.A.: Besche, H.U. and Eick, B. *The groups of order at most 1000 except 512 and 768, J. Symbolic Comput*, 27(1999), No. 4, 405-413, 2000c:20002, 2000.

O'BRIEN, E.A.: Besche, H.U. and Eick, B. *Construction of finite groups, J. Symbolic Comput.* 27(1999), No. 4, 387-404, 2000c:20001, 2000.

O'BRIEN, E.A.: Medvedev, Y. *p-groups, Lie p-rings and p-automorphisms, J. London Math. Soc*. (2)58(1998), No. 1, 27-37, 99m:20035, 1999.

TEE, G. J.: Jean-Luc Chabert *et al, A History of Algorithms: From the Pebble to the Microchip*, Review in *New Zealand Mathematical Society Gazette* 79, 21-26, 2000

TEE, G. J.: Pauline Blincoe (compiler), *Public Works Camps, Poor Kids' Paradise*, Review in *YARN*, 15-16, April 2000

(f) Technical Reports

Mathematics Department Research Report Series

419. Chu-Vandermonde Identities and reduced Kergin Ingterpolation , Shayne Waldron

420. Scattering on a Compact Domain with few Semiinfinite wires attached: resonance case , A. Mikhailova, B. Pavlov, I. Popov, T.Rudakova and and A.M. Yafyasov
421. On Preclosed Sets and Their Generalizations , Jiling Cao, Maximilian Ganster, Chariklia Konstadilaki and Ivan Reilly
422. Domination Condtions for Tournaments , Patricia McKenna, Margaret Morton and Jamie Sneddon
423. Homeomorphism Groups of Manifolds*, P.M. Gartside and A.M. Mohamad
424. Conditions Which Imply Metrizability in Some Generalized Metric Spaces* , A.M. Mohamad
425. The p-local Rank of a Block , Jianbein An
426. Dade's Invariant Conjecture for General Linear and Unitary Groups in Non-defining Characteristics , Jianbei An

427. The Charaxterization of Finite Simple Groups with no Elements of Order Six by Their Element Orders , Jianbei An and Wujie Shi
428. Metrizability of Manifolds by Diagonal Properties* , Paul M. Gartside and Abdul M. Mohamad
429. Developable Spaces and Problems of Fletcher and Lindgren, Abdul M. Mohamad
430. The eigenstructure of the Bernstein operator, Shayne Waldron
431. Covering Properties and Metrisation of Manifolds 2*, David Gauld and M.K. Vamanamurthy
432. Asymptotic Strategy-proofness of the Plurality and the Run-off Rules, Arkadii Slinko
433. The Majoritarian Compromise is Asymptotically Strategy-Proof, Arkadii Slinko
434. Experiences of Doctoral Students in Mathematics in New Zealand, Margaret Morton and Gillian Thornley
435. Valuation of bonds and options under floating interest rate , V. Adamyan and B. Pavlov
436. Order 5 symplectic explicit Runge-Kutta Nystroöm methods , Lin-Yi Chou and P.W. Sharp
437. High order explicit Runge-Kutta pairs for ephemerides of the solar system and the Moon , P.W. Sharp
438. A Generalisation of Komlos Theorem on Random Matrices , Arkadii Slinko
439. Quantum Domain as a triadic relay, A. Mikhailova and B. Pavlov
440. Scattering on graphs and one-dimensional approximation of N-dimensional Schr\"{o}dinger operators , Yu Melnikov and B. Pavlov
441. A Lattice-valued Banach-Stone Theorem , Jiling Cao, Ivan Reilly and Hongyun Xiong
442. Infinite Games Associated with Asymmetric Topologoy and Applications, Jiling Cao
443. Sewing Ribbons on Graphs in Space, Dan Archdeacon, Paul Bonnington, Bruce Richter and Jozef Siran
444. Hermitian symplectic geometry and the Schrödinger operator on the graph, Mark Stuart Harmer
445. Scattering on the annulus , Mark Stuart Harmer
446. A relation between the spectrum of the Laplacean and the geometry of a compact graph, Mark Stuart Harmer
447. Requirements of an N-body integrator for astronomy May 2000 , Philip Sharp
448. Acousto-Optic Scattering in a Single-Mode Optic Fiber , A.V. Badanin, B.S. Pavlov, A.A. Pokrovski, L.V. Prokhorov
449. Comparisons of high order Stormer and explicit Runge-Kutta Nystrom methods for N-body simulations of the solar system , Philip Sharp
450. Weak bases and Metrizability , A.M. Mohamad
451. Characterizations of Moore and Semi-stratifiable Spaces* , A.M. Mohamad
452. On spaces with Quasi-Regular-G_δ-Diagonals , A.M. Mohamad
453. Some Results on Quasi-σ and θ Spaces , A.M. Mohamad
454. A result on N_1-Compact Spaces* , A.M. Mohamad
455. Spontaneous Magnetisation in the Plane , Geoff Nicholls
456. Bridge estimation of the probability density at a point , Antonietta Mira and Geoff Nicholls
457. Random-walk radiocarbon calibration , Geoff Nicholls
458. On Asymptotic Strategy-Proofness of Classical Social Choice Rules , Arkadii Slinko

(k) Videotapes and Films

King, C. **Apocalypsia**: a five episode video series on the threat to world biodiversity and the human cultural traditions.

King, C. Extension of **Genesis of Eden** www.dhushara.com internet encyclopedia.

416 Other Works

BARTON, B. 'Une Archéologie des Concepts Mathématiques: Tamiser le langue pour des significations mathématiques (An Archaeology of Mathematical Concepts: Sifting Languages for Mathematical Meanings)', In John McLoughlin (ed) *Proceedings 1999 Annual Meeting of the Canadian Mathematics Education Study Group, St John's, Canada: Memorial University of Newfoundland*, 57-70, 1999.

BARTON, B. and REILLY, I. 'Topological Concepts and Language: A Report of Research in Progress', *Notices of the South African Mathematical Society*, 30(2), 110-119, 1999.

HONG[5], Y. Y. and THOMAS, M. O. J. 'The TI-92 in Algebra and Calculus', *Workshop at TIME 2000 an International Conference on Technology in Mathematics Education, Auckland, New Zealand*, 2000.

MCINTYRE, D.W. 'Topology Dictionary and Topology Encyclopaedia', *Proceedings of the Fourth Galway Topology Colloquium, Birmingham, UK 11–13 September* 2000 (Published online in Topology Atlas).2000.

MCNAUGHTON, A.J. and LEONG, S. 'Optimising Petrol Distribution', *Proceedings of ORSNZ2000* pp 3 - 7, 2000.

MCNAUGHTON, A.J. 'Generalised Iterative Roots', *Mathematics colloquium 2000.*

OTHER MATTERS RELATED TO RESEARCH ACTIVITIES

Diploma, Honours and Masters Students

Name	Thesis Topic/Title	Supervisor(s)
Lilith Braun	The Bible Code	Dr Joel Schiff
Lilith Braun	Project on Arnold's Tongues	Dr Wayne Walker
Ruby Chen	Voltage Graph Constructions	Dr Paul Bonnington
Lin-Yi Chou	Order5 and 6 symplectic explicit Runge-Kutta Nystrom methods	Dr Philip Sharp
Sabita D'Souza	Spreadsheets and Mathematics Learning	Dr Mike Thomas
John Duncan	Number Theory and discrete groups	Prof. G. Martin
Chih Hseuh Feng	History of Chinese Maths Education	Dr Bill Barton
Chih Hsueh Feng	Maths Ed & Chinese Language	Dr Bill Barton
Mary Graham	MEP & Teaching Excellence	Dr Bill Barton
Rosheen Gray	GCs and Mathematics Learning	Dr Mike Thomas
Peter Green	Set theoretic topology	Dr David McIntyre
Bethanna Jackson		Prof. John Butcher
Majid Karami	Estimates of Hubble's constant	Dr Philip Sharp
Brendan Kayes	Reading course in chaos and fractals	Dr Chris King
Satendra Lal	A Longitudinal Case Study on Using Calculators	Dr Mike Thomas
Stuart Laurence	Summer scholarship, porting and testing astronomical software	Dr Philip Sharp
Simon Leong	Distribution of Petrol	Dr Alastair McNaughton
Ruey Lin	Automatic Fruit Classification	Dr Geoff Nicholls
Sikimeti Mau	Topological Graph Theory	Dr Paul Bonnington
Martine McGregor-Reid	School & Year 1 University Maths	Dr Bill Barton
Helen McKenzie	Women in Mathematics	Dr Bill Barton
Kate Niederer	Gifted students of Mathematics	Prof. Ivan Reilly & Dr Kay Irwin
Alannah O'Sullivan	Hybrid Methods in Nordsieck Representation	Prof. John Butcher
Geof Page	Adjacency Constraints	Dr Alastair McNaughton & Prof D. Ryan
Irene Peng	Laminations and mappings	Prof. G. Martin
Michael Prestidge	Difference Sequences in Graph Drawings	Dr Paul Bonnington
Heather Pryor	Tertiary Students' Understanding of Statistically -Based Media Reports	Dr Maxine Pfannkuch
Edward Rosser	Inverse Problems for PDEs	Dr Colin Fox & Dr Geoff Nicholls
Amanda Rubick	The Statistical Thinking of Twelve Year 7 and 8 Students	Dr Maxine Pfannkuch
Maureen Sheldon	Professional development in assessment Practices in Primary School Mathematics	Dr Maxine Pfannkuch & Dr Kay Irwin
Kerri Spooner	Collaborative mathematics	Dr Mike Thomas
Daniel Timarac	Simulations of M31 and its satellite galaxies	Dr Philip Sharp
Dejan Timarac	One-step methods for finding the orbit of an asteroid	Dr Joel Schiff & Dr Philip Sharp
Sanja Timarac	Mathematics of Finance	Dr Rod Gover & Dr Wiremu Solomon
Simon Toon	Chaos Theory and School maths	Dr Bill Barton
Simon Toon	The teaching of Statistics in Schools: How can we improve it?	Dr Maxine Pfannkuch
Angela Yi-Jing Tsai	Extrapolation applied to Hamiltonian problems	Dr Robert Chan
Karyn Woodruffe	Linux and Mathematics Software	Dr Mike Thomas
Stephen Yau	Boundary Control of a Rotating Beam	Dr Stephen Taylor

PhD Students

Name	Thesis Topic/Title	Supervisor(s)
Willy Alangui	Mathematics and Culture	Dr W Barton & Prof. Ivan Reilly
Alona Ben-Tal	Symmetry Breaking Bifurcations	Dr Geoff Nicholls & Vivien Kirk
Hyuck Chung	Sea/Ice Dynamics	Dr Colin Fox
Nicoleen Cloete	Bayesian inference in population genetics	Dr Geoff Nicholls, Dr Wiremu Solomon & Dr Alan Rodrigo
Grant Emms	Acoustics: Active noise control	Dr Colin Fox
Geoffery Gong	Quasiconformallty Homogeneous Compacta	Prof. G. Martin
Gareth Hegarty	Boundary Feedback Stabilisation of a Nonlinear Elastic System	Dr Stephen Taylor
Shirley Huang	Numerical methods for ODEs	Dr Robert Chan & Prof. John Butcher
Andrei Korobeinikov	Infectious Diseases	Dr Wayne Walker
Saraswathi Kota	Affective Factors and Algebra Problem Solving – GRADUATED	Dr Mike Thomas & Prof. Ivan Reilly
Sanka Liyanage	Teachers' Use of Informal Assessment	Dr Mike Thomas & Dr Kay Irwin (Edn)
Colleen McMurchy-Pilkington	Politics of Maori Maths Education	Dr Linda Smith & Dr Bill Barton
Tamsin Meaney	Indigenous Maths Curriculum Devt.	Dr Bill Barton & Dr Kay Irwin
Nicolette Moir	Numerical methods for ODEs	Dr Robert Chan & Prof. John Butcher
Greg Oates	Graphics Calculators in Undergraduate Maths	Dr Mike Thomas & Dr Bill Barton
Kerry Richardson	Topological Languages	Dr David McIntyre & Prof. David Gauld
Alan de los Santos	Graphics calculators and Mathematics learning	Prof. Ivan Reilly & Dr M Thomas
Thomas Scelo	Acoustics: Sound Transmission in timber framed structures	Dr Colin Fox
Jamie Sneddon	Infinite Planar Graphs	Dr Paul Bonnington
Jeff Tsai	Discrete Groups	Prof. G. Martin
Sanja Todorovic-Vasilevic	Symmetries of non-orientable surfaces	Prof. Marston Conder & Dr Eamonn O'Brien
Brian Van Dam	Topological Resolutions	Prof. David Gauld
Ian Whaley	Acoustics: Auralization	Dr Colin Fox
William Wright	Numerical methods for ODEs	Dr Robert Chan & Prof. John Butcher

Research Fellows & Visitors

Name	Affiliation
Janet Ainley	Deputy Director, Institute of Education, University of Warwick
Pam Bishop	Birmingham University
Caitlin Buck	Cardiff University
Andreas Cap	Erwin Schrodinger Institute, Vienna
David Chen	Ling Tung Institute of Technology, Taiwan
Tina Chan	National Taichung Institute of Technology, Taiwan
Everett Dade	University of Illinois at Urbana-Champaign
Neville Davies	Nottingham Trent University
John Dempsey	Clarkson University
Persi Diaconis	Stanford University
Michael Eastwood	University of Adelaide
Paul Gartside	University of Pennsylvania at Pittsburg
Professor Peter Gill	School of Chemistry, University of Nottingham
Chris Good	Birmingham University
Kengo Hirachi	University of Tokyo
Celia Hoyles	Institute of Education, University of London

Laurent Jay	University of Iowa, USA
Keith Jones	Southampton University
Jari Kaipio	Kuopio, Finland
Minnie Kerr	University of Queensland
Pavel Kurasov	Stockholm University
Zorana Lazarevic	University of Alaska
Dick Lesh	Purdue University
Volker Mayer	University of Lille
Robert McLachlan	Massey University, Palmerston North
Jesper Moller	Aalborg, Denmark
Richard Noss	Institute of Education, University of London
Peter Nyikos	University of South Carolina
Harsha Patadia	Garuda Univ, India
Zbigniew Piotrowski	Youngstown State
Tomaz Pisanski	University of Ljubljana
Bruce Richter	University of Waterloo
Seppo Rickman	University of Helsinki
Havard Rue	Trondheim, Norway
Jozef Siran	Slovak Technical University
Erki Sommersolo	HUT, Finland
Mike Steel	University of Canterbury
Jerry Vaughan	University of South Carolina
Mark Watkins	Syracuse University
Peter Winbourne	South Bank University, London
Hongyun Xiong	Dean of Science, Tianjin University

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

Professor Celia Hoyles and Professor Richard Noss (Mathematical Sciences Group, Institute of Education, University of London.)
Title: Students' conceptions of proof

Tsukasa Yashiro (Department of Mathematics)
Title: Lifting immersions of 3-manifolds in 4-space to 5-space

Nathaniel Friedman (University of Albany SUNY)
Title: Construction of Mixing Transformations for Ergodic Theory

Dr Bill Barton (Mathematics Education Unit)
Title: A Report on the First Brazilian Ethnomathematics Conference

Hideki Omori (Science Univ of Tokyo)
Title: Generalized Lie groups and Applications

Rosheen Gray, Karyn Woodruffe, and Kerri Spooner.
Title: Reports from the Royal Society Teacher-Fellows in Mathematics in 2000.

Prof Wilhelm Kaup (University of Tuebingen, Germany)
Title: Bounded symmetric domains in finite and infinite dimensions.

Harsha Patadia (The M.S. University of Baroda, Gujalat State, India)
Title: A Strategy for Mastery Learning

Zorana Lazarevic (University of Alaska at Fairbanks)
Title: Introduction to partition relations

Ralph Stohr (UMIST, United Kingdom)
Title: Free Lie Algebras as Modules for Finite Groups

Zorana Lazarevic (University of Alaska, Fairbanks)

Title: The work of Aldis

Stuart Scott (Department of Mathematics)
Title: Compatibility Talk (6 in series)

Paul Gartside (Oxford and Pittsburg Universities)
Title: Universal Sets

Dr Maxine Pfannkuch (Departments of Mathematics and Statistics)
Title: Statistical Thinking in Empirical Enquiry

David McIntyre (Department of Mathematics)
Title: New insights into Balogh's Dowker space (series of 2)

Allen Rodrigo (SBS)
Title: Modelling the population dynamics of HIV

Dr Koeno Gravemeijer (Freudenthal Institute, The Netherlands)
Title: Symbolising and modeling in exploratory data analysis: A report on a study with 12- and 13-year-old students

Mike Steel (Director, Biomathematics Research Centre, University of Canterbury, Christchurch, New Zealand)
Title: Parsimony, likelihood and the role of models in molecular phylogenetics

John McKenzie (Department of Mathematics)
Title: A Computer Program for Identifying Kleinian Groups

Dr Janet Ainley (Deputy Director (Mathematics Education), Institute of Education, University of Warwick, UK.)
Title: Exploring The Transparency Of Graphs And Graphing

Denis Labutin (ANU)
Title: Potential Theory for Fully Nonlinear Equations

Dr Arkadii Slinko (Department of Mathematics)
Title: General Impossibility Theorems and Beyond

Zorana Lazarevic (University of Alaska at Fairbanks)
Title: Preimages of Shrinking Spaces

James Sneyd (Massey, IIMS)
Title: Travelling waves of calcium: experiments and bifurcations

Bill Barton, Keith Jones (Southampton) and Mac McKenzie (Unitec)
Title: Reports from the 19th International Conference on Mathematics Education.

David McIntyre (Department of Mathematics)
Title: Finite intervals in posets of regular topologies

Colin Fox (Department of Mathematics)
Title: Exact mode, perfect samples: summary statistics in image analysis

Colin Fox (Department of Mathematics)
Title: Concert Hall Acoustics and Number Theory

Mark Wilson (University of Montana)
Title: Asymptotics of multivariate sequences: analytic aspects

Artemiza Filimon (Department of Mathematics)
Title: Models of the optimal form of interest rate targeting

Jerry Vaughan (University of North Carolina at Greensboro)
Title: Introduction to linearly stratifiable (series of 4

Theresa P. Vaughan (University of North Carolina)
Title: On Union-Closed Families

Prof Len Bos (Calgary)
Title: A semi-simple method for pricing an option based on a mean-reverting asset

Geoff Nicholls (Auckland, Math)
Title: Bridge estimators for Bayes factors

David Gauld (Department of Mathematics)
Title: Highlights of TOPO2000 at Oxford, Ohio

Mark Wilson (Montana, Math)
Title: Probability generating functions for multivariate distributions

David Barton and Stuart Laird
Title: A discussion about the 7th Form maths textbook `Delta Mathematics'.

Gaven Martin (Mathematics Department)
Title: 100 years of the Beltrami equation

Arkady Leiderman (Ben-Gurion University of the Negev)
Title: Kolmogorov's superposition theorem and its applications

Andrew Stafford, Senior College of NZ, and Mathematics Education Unit staff
Title: Statistics Workshop and new opportunities for High School mathematics students and teachers.

Peter Nyikos (University of South Carolina)
Title: Various axioms and their uses

Peter Nyikos (University of South Carolina)
Title: Producing the Eisworth-Nyikos-Shelah model

Ye Yoon Hong & Mike Thomas (Mathematics Education Unit)
Title: Super-calculators and Mathematics examinations.

Peter Nyikos (University of South Carolina)
Title: Hereditary properties in locally compact, locally connected spaces

Peter Nyikos (University of South Carolina)
Title: Topological properties of trees

Prof Mark Wilson (University of Montana)
Title: Asymptotics of multivariate sequences

Peter Nyikos (University of South Carolina)
Title: Trees and their topological properties

Peter Nyikos (University of South Carolina)
Title: Hilbert's First Problem and the foundations of mathematics

Zuowei Shen (National University of Singapore)
Title: Cardinal Interpolation

Peter Nyikos (University of South Carolina)
Title: Small uncountable cardinals and applications

Peter Nyikos (University of South Carolina)
Title: New Techniques in Set-theoretic Topology (Series of 2)

Peter Nyikos (University of South Carolina)
Title: Hereditary Normality and Metrizability of Manifolds (Part 2 of 2)

Peter Hughes (Centre for Mathematics Education, Auckland College of Education)
Title: A Major New Zealand Initiative in Teaching Mathematics to Year 1 to 6 Children.

Peter Nyikos (University of South Carolina)
Title: Hereditary Normality and Metrizability of Manifolds (Part 1 of 2)

Peter Gill (School of Chemistry, University of Nottingham)
Title: Construction and use of Stewart atoms

John Butcher (Department of Mathematics)
Title: Heun and the Runge-Kutta method

Chris Good (Birmingham University)
Title: The axiom of choice in topology (Series of 5)

Denis Hirschfeldt
Title: Structure and nonstructure in computable structure theory

Peter Winbourne (Centre for Mathematics Education, South Bank University, London)
Title: Constructing narratives about learner's identities; how might they inform the teaching of mathematics.

David Gauld (Department of Mathematics)
Title: The Poincaré Conjecture 100 years on

George Anastassiou (University of Memphis)
Title: Recent Advances in Approximation Theory

John Holt (University of Michigan)
Title: Deformation theory of hyperbolic 3-manifolds (series of 6)

Zbigniew Piotrowski (Youngstown State University)
Title: The plasticity of some metric spaces

Arkadii Slinko (Mathematics Dept)
Title: Arrow's Impossibility Theorem and Ultrafilters

Zbigniew Piotrowski (Youngstown State University)
Title: Separate and Joint Continuity

G.J. Martin (Ackland)
Operator Algebras (series of 6)

Everett C. Dade (University of Illinois at Urbana-Champaign)
Title: Group-Graded Algebras and Clifford Theory

Research Grants

MARSDEN FUND GRANTS

Prof. J. Butcher & Dr. Rorbert Chan	Practical methods for ODEs ($169000), Efficient methods for ODEs ($228000)
Prof. M. Conder, Dr J. An & Dr E. O'Brien	Effective computational approaches to questions in group theory and its applications ($81875 include GST)

Dr C. Fox & Dr G. Nicholls	New methods for physics-based statistical inference ($180000)
Profs. V. Jones, M. Conder, D. Gauld and G. Martin	Interations between group theory, topology and mathematical physics ($81250 include GST)
Prof V. Squire, Dr C. Fox & M. Meylan	Wave Scattering Theory Applied to the Marginal Ice Zone and Other Random Media ($189000 p.a.)
Prof G. Martin	Analysis and Geometry ($125000 pa)

OTHER EXTERNAL GRANTS

Dr Mike Thomas	Casio: TIME 2000Conference ($20000), Texas Instruments: Funding ($4000), NZ Ministry of Education: TIME 2000Conference funding ($2500)
Dr Mike Thomas	Teacher Fellows ($149626) RSNZ
Dr Eamonn O'Brien	University of London, Humboldt Foundation, University of Georgia, Northeastern University, Stanford University, University of Queensland, University of Sydney, Australian National University, University of Western Australia: Visiting Fellowship support ($30000 estimate)
Dr Bill Barton	Texas Instruments (equipment): Maths Enhancement project ($50000), Woolf Fisher Research Centre: Maths Enhancement Project ($45000)
Dr Arkadii Slinko	Center for Economics Design (Turkey): Support of my visit to SED 2000 as invited speaker ($1000 USD)
A/Prof N. Levenberg	NSERC (Canada), T. Bloom, U. of Toronto (one month) NSF (USA), E. Poletsky, Syracuse U. (two weeks) NSERC (Canada), L. Bos, U of Calgary (one week) KBN (Poland), Z. Blocki/S. Kolodziej, Jagellonian U. (one week) NCRC (Sweden), U. Cegrell, M. Passare, Stockholm U. and Umea U. (two weeks)
Prof. G Martin	NSF (USA) [travel, accomodation and local expenses] Syracuse University, Rutgers University & Columbia University Australian Research Council [accomodation, local expenses] ANU

UNIVERSITY of AUCKLAND: STAFF RESEARCH GRANTS

Dr Rod Gover	Differential Geometry etc ($6,900)
Dr Chris King	Third millennium research resource ($4500)
Dr Eamonn O'Brien	Sabbatical travel support ($6000)
Dr Philip Sharp	N-body simulations ($2500)
Dr Stephen Taylor	Boundary Control and Computational Quantum Chemistry ($6000)
Dr Stephen Taylor	Grant-In-Aid for Research and Study Leave ($6000)

UNIVERSITY of AUCKLAND: GRADUATE RESEARCH GRANTS

Dr Mark Harmer	Schrodinger operators ($2000)

UNIVERSITY of AUCKLAND: RESEARCH INFRASTRUCTURE GRANTS

Dr Bill Barton	The STAR project ($30,000)

Staff leave and Conferences

Invited/plenary lectures marked with an asterisk (*)

Mr. David Alcorn	NZ Mathematics Colloquium, Waikato University (27-29 November)

Dr Bill Barton	International Congress on Mathematics Education, Tokyo, Japan* First Brazilian Conference on Ethnomathematics, Sao Paulo, Brazil* Technology in Mathematics Education, Auckland
Dr Paul Bonnington	Algebraic and Topological Methods in Graph Theory, University of Auckland (11-15 December)* University of Otago, seminar
Prof. John Butcher	ANZIAM 2000, Waitangi (February)* Visit to Arizona State University (March-April) Visit to Tulane University (April) IMACS 2000 Congress, Lausanne (August)* Visit to INRIA, Rennes (August) Visit to Université Lyon (September) Visit to Humboldt Universität, Berlin (October) Symposium in honour of Prof. Roswitha März (October) Visit to Technische Universität München (October) New Zealand Mathematics Colloquium, Hamilton (November) Workshop on Geometric Integration, La Trobe University, Melbourne (December)*
Dr Robert Chan	Short leave (Semester 2, 1999) ANZIAM, Waitangi (February) SciCADE1999, Fraser Island, Australia (August 1999)
Prof. Marston Conder	NZMRI Meeting on Algorithms & Complexity, Kaikoura (January) Symposium for 10th Anniversary of CDMTCS, Auckland (May) NZ Maths Colloquium, Hamilton (November) Conference on Algebraic & Topological Methods in Graph Theory Auckland, (December)*
Dr Colin Fox	Long leave taken, second semester of 2000 and first semester of 2001. IUTAM: Scaling Laws in Ice Mechanics and Ice.University of Alaska Fairbanks (June 13-16)* IGS conference on Sea Ice and its interactions. University of Alaska Fairbanks (June 19-23)* MAXENT2000, Bayesian Inference and Maximum Entropy Methods in Science and Engineering CNRS, Gif sur Yvette, France (July 8-13)*
Prof. David Gauld	NZMRI Meeting on Algorithms & Complexity, Kaikoura (January) Summer Topology Conference (July) NZ Maths Colloquium (November)
Dr Rod Gover	Polish Academy of Sciences conference, 'Symmetries in Geometric analysis' at the Stephan Banach International Mathematical Center, Warsaw, Poland* Lie Groups and Applications 2000, University of Adelaide NZ Math. Colloquium 2000, Waikato University
Dr Sina Greenwood	Devonport Topology Festival, Auckland (February) Algebraic and Topological Methods in Graph Theory, Auckland (December)
Dr Allison Heard	NZ Mathematics Colloquium, Waikato University ANZIAM, Waitangi Research Symposium on Geometric Numerical Integration, La Trobe University
Dr Mark Harmer	Kruskal 2000-Integrable Systems Conference on Geometric Analysis,* Australian Mathematical Society Annual Meeting Queensland University Inaugural Mathematical Physics Workshop*
Mrs. Pamela Hurst	AAMT Conference, Melbourne (January)

	LOGOS 8 (October) TIME 2000 (December) ATEC (November) LOGOS 9 (December)
A/Prof. N. Levenberg	Nordan Complex Analysis Conference (Ornskoldsvik, Sweden), May 2000.* Wabash Analysis Meeting (Indiana), December 2000* Jagellonian University, Krakow (Poland) Universite Paul Sabatier, Toulouse (France) Purdue University, West Lafayette (Indiana)* University of Western Ontario (Canada) Syracuse University (New York) Colloquium speaker University of Wisconsin, 2000
Prof. Gaven Martin	NZMRI Meeting on Algorithms & Complexity, Kaikoura (January) Future of the Fundamental Sciences: National University of Singapore Partial Differential Equations and Geometry: Australian National University* Australian Math. Society Annual Meeting (NZMS Representative) Algebraic and Topological Methods in Graph Theory: Auckland American Math Society Meetings, Columbia University, NY* Rutgers University, Colloquium speaker University of Syracuse: (x2) partially supported by the US National Science Foundation Joint work with Prof. Iwaniec Rutgers University: partially supported by the US National Science Foundation Joint Work with Prof. Gilman Graduate Centre, CUNY
Mr. Chris King	Long leave to document the human impact on biodiversity and participate in a teaching workshop in Israel, subsequently to become the video series Apocalypsia (1999)
Dr Vivien Kirk	Parental leave (February-March), NZ Mathematics Colloquium (November)
Dr David McIntyre	New Zealand Mathematics Summer Workshop, Kaikoura (7–15 January) Devonport Topology Festival (24 February) The Fourth Galway Topology Colloquium, Birmingham (11–13 September) New Zealand Mathematics Colloquium, Hamilton (27–29 November) Algebraic and Topological Methods in Graph Theory, Auckland (11-15 Dec)
Dr John McKenzie	Devonport Topology Miniconference*
Dr Alastair McNaughton	Mathematics colloquium 2000 Waikato (November 28-30) Operational Research Society of NZ 2000 Victoria (December 1,2)
Ms Barbara Miller-Reilly	Technology in Mathematics Education (TIME), Auckland (December)
Dr Geoff Nicholls	Short Term Absence in weeks 11 and 12 of Semester I ANZIAM 2000, Bay of Islands Bernoulli 2000, Mexico ISBA 2000, Crete
Mr. Greg Oates	Special Leave (April) TIME 2000 conference, University of Auckland (December) Virtual Conference 2000
Dr Eamonn O'Brien	Sabbatical leave (First semester 2000) Leave without pay (Second semester 2000) Groups and Geometries, Milan (May)* Group Theory, Galway (June)* Group Theory, University of London (June)*

Prof. Boris Pavlov,	IWOTA , Bordeaux, June 2000, plenary talk* Second International Conference on Unconventional Models of Calculations, (UMC'2K), 13-16 Dec. 2000, Solvay Institutes, Brussels,* Memorial Seminar of academician V.A.Fock, November 2000, St.Petersburg University. Intl. Conf. on Dynamical Systems and Integral Equations, Atlanta* NTCONGS Project, Brussels.
Ms Judy Paterson	Short leave to work with Prof. Chris Breen at the University of Cape Town
Dr Maxine Pfannkuch	Research and Study Leave (July-December) MERGA Conference, Fremantle, Western Australia (5-9 July) TIME Conference, Auckland (11-14 December) LOGOS#6, Auckland (18 April) LOGOS#7, Auckland (16 June) LOGOS#8, Auckland (6 October) LOGOS#9, Auckland (11 December)
Prof. Ivan Reilly	NZ Mathematics Institute Summer School, Kaikoura (Jan 4-11) Now is the Future; the Gifted Student in today's Secondary Schools, Auckland (Oct 3-5) NZ Mathematics Colloquium, Hamilton (Nov 26-29)*
Dr Philip Sharp	New Zealand Mathematics Colloquium (November) JPL Pasadena (joint work with Grazier and Chodas) University of Toronto, seminar University of Ottawa (joint work with Vaillancourt) Queen's University (joint work with Verner)
Dr Arkadii Slinko	Inaugural Conference of the Society for Economics Design (SED 2000)* V International Meeting of The Society for Social Choice and Welfare
Dr Stephen Taylor	Short leave (July-August, September-January 2001) McNabb Symposium ANZIAM 2000
Mr. Garry Tee	Symposium for 10th anniversary of CDMTS (Auckland) NZ Mathematics Colloquium 2000, Hamilton ATMGT 2000
Dr Mike Thomas	Logos #6 Collaboration in Mathematics Education Research and Graduate Programmes, Auckland University 24th Conference of the International Group for the Psychology of Mathematics Education, Hiroshima, Japan Logos #8, October, Mathematics Education Research A Catalyst for Change, one day conference Logos #9 International Collaboration in Mathematics Education Research, Auckland University TIME 2000 an International Conference on Technology in Mathematics Education, Auckland, New Zealand AAMT conference, VC2000, Teaching and Learning in World Mathematics Year 2000: Exploring the possibilities
Mrs. Moira Statham	ATEC Annual Conference (November) LOGOS 6 (April) LOGOS 8 (October) LOGOS 9 (December) TIME 2000 (December)
Dr Wayne Walker	Turning the Tide, AUT

COMMUNITY SERVICES

Below I have chosen a selection of the many different and significant contributions the departments makes to the wider community both academically and otherwise.

David Alcorn continued his work as chair of the committee responsible for publishing the NZ Journal of Mathematics and served as Book Reviews Editor for the NZ Mathematical Society Newsletter

Dr Bill Barton served on the Editorial Board of the journal Educational Studies in Mathematics and as Assistant Editor of the Mathematics Education Research Journal and as Review Editor of the journal For the Learning of Mathematics. He was also served on the executive of the NZ Mathematical Society and gave a number of talks at schools.

Dr Paul Bonnington served (as Vice-President) on the Council of the Combinatorial Mathematics Society of Australasia. And was one of the key members of the Universities IT review.

Prof John Butcher served on the editorial board of four major applied mathematics journals, Acta Numerica, Numerical Algorithms NZ J. Math and Applied Numerical Mathematics, where he was also a special guest editor.

Dr Bruce Calvert served on the Editorial Board of the Journal of Abstract and Applied Analysis

Dr Robert Chan was Guest Editor for a special volume in honour of John Butcher, NZ J. Math Vol 29, Oct. 2000.

Prof. Marston Conder as DVC (Research) continued to be heavily involved in many aspects of the University's administration. He was also on the Fellowship Selection Panel of the RSNZ and a Director of the NZMRI and was on the editorial board of the NZ J. Math.

Dr. Colin Fox gave a number of talks to schools and other groups on his Antarctic Research, was Head of the University's Acoustic Research Centre, and served on the Committee of the NZ Acoustical Society.

Prof. D. Gauld chaired the Review of the School of Engineering, served as the Assistant Dean (Budget) for the faculty of Science, was secretary of the NZMRI, convener of the judging panel -Aitken Prize- NZMS (Alison Heard was also on this panel) and was an organiser of the summer topology conference.

Dr. Sina Greenwood was heavily involved in running our Aldis programme, an outreach programme for Mathematics Students from decile 1 & 2 schools in the Auckland region. She also organised the Maori and Pasifika common room which is now running successfully and has been helping with tutorials and support for these students.

Dr Vivien Kirk served on the Council of the NZ Mathematical Society.

Prof. Gaven Martin served on the Mathematical Sciences Advisory Panel, NZMS, the Mathematical and Information Sciences Advisory Panel, RSNZ, and the Fellowship Election Panel (Mathematical Sciences), and Director of NZMRI.

Ms. Barabara Miller-Reilly continued in her role as the NZ agent for the `Bridging Mathematics Network' and the European Unions `Adults Learning Mathematics Research Forum'

Ms. J. Patterson acted as the Heads of High Schools Mathematics Departments reference for teachers completing the universities teacher training programme.

Dr. M. Pfannkuch was the IASE national correspondent, spoke at the Senior College of NZ on teaching statistics and coordinated our submission to the NZQA on the NCEA standards.

Dr Eamonn O'Brien served on the Advisory and Editorial Council for the computational algebra system GAP (advising on development of the system and acting as an editorial board for software submitted for the system). He has also been invited as Guest Editor for a special issue of the Journal of the Australian Mathematical Society

Prof. I Reilly was chair of the NZ Math Olympiad committee, and continued in his role as the NZ liaison officer with the University of California Education Abroad programme.

Dr. J. Schiff was involved in the day to day running of the NZ J. Math. as Executive Editor and also edited and published Meteorite! Magazine.

Dr Arkadii Slinko and retired Assoc. Prof. Gordon Hookings both continued their important work in the training and selection of NZ participants for the International Mathematical Olympiad, and Dr Slinko was co-Leader of the NZ team for the 1998 International Mathematics Olympiad

Dr Wiremu Solomon served as a member of the Executive Committee of the New Zealand Statistical Association, the Science Faculty's Staffing Committee and its Committee for Maori Equity in Science, and the University's Operations Research Committee. He was also a Marker for the 1998 Bursary Examination in Mathematics with Statistics, and continued to offer tutorials for Maori and Pacific Island students in mathematics as part of our Aldis Programme.

Ms. Moira Statham served as Deputy Coordinator of the Wellesley Programme, and together with Pam Hurst was involved in interviewing prospective students for the programme, their subsequent orientation to the University, pastoral care, and giving them advice on options for further study upon completion. Organising Committee for Time 2000 and International conference on Technology in Math. Education.

Dr Steve Taylor was on a number of conference organising committees (ANZIAM & McNabb Symposium) and assisted with the Coca-Cola Youth Expo

Mr. Garry Tee continues as our NZMS correspondent and gave an invited lecture at the Auckland Medical Historical Society on Lancelot Hogben and at the University of Waikato

Dr. Mike Thomas was the NZ Universities representative of the `National Scholarship Examination' workparty and the NZVC NCEA mathematics panel, and gave presentations at a number of schools on using technology in teaching.

VII. OTHER MATTERS

Staffing

1999 started with the recruitment of a new Departmental Administrator Mr. Ross McCallum. Ross has grown to the challenge of organizing such a large department and his contributions, along with those of the secretarial staff Olita Moala and Min-Young Lee have been crucial in the success of the Department in meeting its mission. In particular Min-Youngs contribution was recognised with a Faculty of Science General Staff Award in December.

A long-standing member of the Department, Lynne Gilmore a Senior Tutor at Tamaki, took early retirement in April 2000. Mohan Chinnappan resigned to take up a post at the University of Wollongong.

The vacant chairs of Profs. J. Butcher, G Wake and M. Conder, as well as other recently vacated positions have not been filled. These issues were addressed in the Departments strategic plan and committes have now been set up to fill the Industrial and Applied Math Chairs, the search should be completed in early 2001.

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

Dr J. An	special Increment Over Senior Lecturer bar
Dr B. Barton	over Senior Lecturer bar
Dr A. Slinko	over Senior Lecturer bar
Dr M. Thomas	over Senior Lecturer bar
Dr E. O'Brien	special Increment in Senior Lecturer
Dr R. Gover	to Senior Lecturer
Dr P. Sharp	to Senior Lecturer
Ms. M. Statham	over Senior Tutor bar
Mr G. Oates	to Senior Tutor
Ms W. Stratton	to Senior Tutor

The Department is grateful to the Science Faculty for its support in the promotions round this year which resulted in unprecedented success.

Department Administration

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

Deputy Head of Department	Mr. David Alcorn
Head of Department's Advisory Group	Prof. Boris Pavlov, Prof. David Gauld, Dr Colin Fox, Prof. J Butcher, Mr. David Alcorn
Department Staffing Advisory Committee (Academic Promotions)	Prof. John Butcher, Prof. David Gauld, Dr Margaret Morton, Prof. Ivan Reilly
Academic Staff Performance Reviewers	Prof. David Gauld, Prof. Boris Pavlov, Prof. Ivan Reilly
Head of Mathematics Education Unit	Dr Mike Thomas/Dr Bill Barton
Head of Tamaki Mathematics Group	Dr Robert Chan
Director of Graduate Studies PhD	Dr. S. Geenwood and Prof. DB Gauld
Director of Graduate Studies Msc	Dr Wayne Walker
Research Coordinator	Prof. David Gauld
Teaching Coordinator	Dr Margaret Morton
Computing Services	Dr Paul Bonnington, Dr David McIntyre, Dr Philip Sharp, Dr Mike Thomas
BTech (Industrial Maths) Programme Coordinator	Dr Steve Taylor
Enrolment Coordinator	David Alcorn
Timetable Administrator	Chris King
Examinations Coordinator	Chris King
Publicity Officer	Dr Bill Barton
Regulations/Handbooks	Dr David Smith
EEO/EEdO Representative	Dr Bruce Calvert
NZ Mathematical Society Correspondent	Garry Tee
Webmaster	Dr Shayne Waldron
Overseas Students & Ad Eundum Admissions	Assoc. Prof. M.K. Vamanamurthy / David Alcorn
Library Liaison Officer	David Alcorn
Convener of Staff/Student Liaison Committee	Greg Oates
Safety Officer	Ross McCallum
Lab Demonstrators Coordinator	Nicolette Goodwin
Markers Coordinator	Roy Swenson
Department Research Report Series	Olita Moala
Seminars:	
Algebra, Geometry & Combinatorics	A/Prof J An
Analysis	Dr R. Gover
Applied, Computational & Industrial Maths	Dr Robert Chan
Mathematics Education	Ms Judy Paterson
Topology	Prof. David Gauld and Sina Greenwood
Faculty Representatives:	
Arts	David Alcorn
Commerce	Dr Joel Schiff
Engineering	Dr Geoff Nicholls

University Committees:

Dr Bill Barton	Education Committee, Human Subjects Ethics Committee
Dr Bonnington:	Subprofessorial Rep on Information Technology Committee Lecturers Association Executive Faculty of Science IT Review
Prof Conder:	DVC (Research) Potgrad, Planning and Resources, Education, Budget, Quality Committees
Prof Martin	Research Committee, Education Committee, University Taskforce on Enrolment

Dr Taylor: Faculty advisor Coca-Cola Youth Expo

New Zealand Journal of Mathematics

The New Zealand Journal of Mathematics is jointly produced by the Department and the New Zealand Mathematical Society, with Editorial staff consisting of Prof. Gaven Martin (Editor), Dr Joel Schiff (Executive Editor), Dr Jianbei An (Associate Editor), Min Young (Editorial Assistants), and Betty Fong (Production Assistant). Two issues of Volume 29 (Numbers 1 and 2) of the NZJM were published during the year. Members of 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 David Alcorn (who is also convener of the Committee) and Prof. Ivan Reilly.

Of particular note is Volume 29 Number 2 which is a special issue (edited by Dr R. Chan) in honour of Professor J.C. Butcher.

VIII.

OVERALL COMMENTS ON WORK AND PROGRESS WITHIN THE DEPARTMENT

The Department is actively pursuing the broad aims set out in the University's mission documents, encouraging a high quality environment for teaching and learning, continuing to undertake world class research in several areas, and attracting and supporting an increasing number of postgraduate students. The Department is clearly the strongest department in this country, by any measure, and in virtually every area. Within Australasia we rank within the top few.

Our ability to achieve greater aims is hampered by a relatively low level of resourcing, and of considerable worry is the lack of adequate tutorial and computer laboratory facilities for undergraduate students. The Department was externally reviewed in 1998, and received a laudatory report on its research and teaching programmes, along with some constructive suggestions for further developments. These have largely been implemented. However, the lack of a properly mounted system of tutorials was highlighted and has not been addressed.

Finally, on a personal note, I would like to thank the very many staff whom I have relied on this year for help and advice. I would particularly like to mention Ross McCallum (Admin), David Alcorn (Teaching), David Gauld (PhD, admin etc), Paul Bonnington and Phillip Sharp (Technical and Capex) and Mike Thomas and Bill Barton (Math Ed) who have put in a considerable effort to help me in various ways.

Prof. Gaven J. Martin FRSNZ
Head of Department of Mathematics