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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

Contents

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PUBLISHER'S NOTICE

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Web Sites

The homepage of the New Zealand Mathematical Society with URL address:
http://www.math.waikato.ac.nz/NZMS/NZMS.html (Webmaster: stephenj@math.waikato.ac.nz)
The newsletter is available at: http://IFS.massey.ac.nz/mathnews/NZMSnews.shtml
Editorial enquiries and items for submission to this journal should be submitted as text or LaTeX files to r.mclachlan@massey.ac.nz

EDITORIAL

WE COME FROM THE LAND OF ICE AND SNOW...

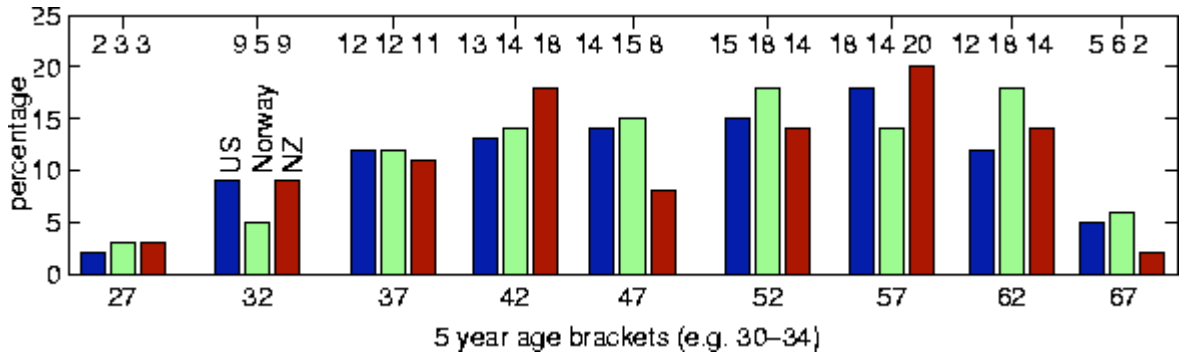
As always when traveling, the similarities can be more surprising than the differences. So it is with Norway, where I am spending nine months on sabbatical at the Center for Advanced Study in Oslo. Norway has 4.5m people and often considered to be cold and relatively remote. The people, although not as exuberant as their Danish neighbours, are unpretentious and very happy with their society and traditions. They are proud of their scientific history: in mathematics, not only Abel and Lie, but also Sylow, Thue, Stø rmer, and Skolem. The flame of Abel, in particular, is kept burning very brightly, as very quickly a lack of state support was blamed for his early death. You'll hear even more about him in 2003 when the Abel Prize for lifetime achievement in mathematics, backed by a $50m government endowment, is awarded for the first time[1]. A fine 20 krø ne coin has just been issued to celebrate his bicentenary, although I haven't had one in my change yet.

In some ways, Norway is even more like the New Zealand of old than of today: a sweeping right to roam the countryside has been retained, and even a right to gather wild food on private land; baches are extremely common, but are still usually simple one room huts. One big difference, of course, is that Norway has a per capita income about three times that of New Zealand, plus a huge Oil Fund for the future. But high taxes and a high cost of living reduce this apparent difference.

The Norwegian Research Council recently commissioned a review of mathematics and computer science in Norwegian universities, from an entirely international panel. Their report makes the overall situation sound very similar to New Zealand: Norway currently has 154 university mathematicians and statisticians. Their quality is excellent but there are too few graduate and undergraduate students to support the economy and even too few to replace the university staff as they retire: 54 staff are aged 55 and above. Like New Zealand, Norway under-invests in research, spending 1.7% of GDP on R&D (New Zealand, 0.9%; OECD, 2.2%; USA, 2.7%). Its economy, based on oil, fish, and timber, is largely extractive, reducing the number of research jobs. Low salaries and a perceived remote location make it hard to attract foreign staff, and it is hard to get quick decisions on PhD and postdoc positions. So it seems that even one of the richest countries in the world in not immune to these widespread problems.

The recommendations are quite specific, endorsing the Centres of Excellence that have been created (!) and the CAS where I am now[2]. Departments should act strategically when whole groups are about to retire. Research groups (as opposed to individuals) should be encouraged, and their research, when it has drifted into less important areas, should be strategically focussed. The best departments (e.g. NTNU in Trondheim) should hire more staff-amazingly, it seems that this last is to be acted on immediately.

The report considers the age distribution a cause for concern. If so, then that concern should be widespread! I gathered a little data from the US (http://www.ams.org/cbms/cbmssurvey-whole.pdf, year 2000, includes 15471 staff) and NZ. Thanks to all who responded to my request for information. I was able to get data on 88.5 staff which shows that the distributions in all 3 countries are very similar, and all have a median age of about 51. Within NZ, there are some wide variations: Auckland, median age 49; Massey PN, 56; Massey Albany (includes stats), 41; Waikato, 46; Otago (includes stats), 53. To me this suggests that, while there is some age bias, the situation is hardly extreme and that in New Zealand, with a little forward planning (and a little help from the NZIMA!), we should be able to smooth our path into the future easily.



Apart from the consolation that we're not alone, one thing I learnt from this report is that reviews and panels can be refreshingly brief and direct, can be entirely free of bumf and boilerplate, and can be taken seriously.

Robert McLachlan

[1]See www.math.uio.no/abel.html. By visiting the Abel museum at his deathplace Froland Verk, I was even moved to read *Called Too Soon by Flames Afar: Niels Henrik Abel and His Times* by Arild Stubhaug. In the course of which, to paraphrase Charles Schulz, I learnt more about Abel than I cared to know.

[2]The 10 year review of the CAS noted that, despite its healthy budget, it hasn't attracted the visitors of Nobel and Fields standard that was hoped; they're even *more* expensive!

PRESIDENT'S COLUMN

There remains a lot happening in the New Zealand Mathematical scene.

There have been ten new Marsden grants this year, including three new fast starts, and a number of new faces. The NZIMA money has been allocated all around the country, and in areas from modeling to logic to the Olympiad. Everyone is encouraged to apply for the next round of funding. See Marston's article in the newsletter. Two prominent New Zealand mathematicians have been appointed to personal chairs around the country, congratulations Mike Steel and Robert McLachlan. Also two prominent New Zealand mathematicians have been recognized by Royal Society of New Zealand for their contributions and have been elected to the Fellowship: congratulations Graham Weir and Robert McLachlan (who is thus doubly congratulated). We have also elected another Fellow of the New Zealand Mathematical Society, which will be announced at the Auckland Colloquium. New Zealand also did well at the Math Olympiad obtaining its highest ever placing of 34th out of 84, and its first ever gold medal to Simon Marshall of Onslow College, Wellington. There are a dedicated group of people involved in this, lead by Michael Albert of Computer Science in Otago.

Discussions with the Israel Mathematical Society have now reached the point where we are arranging the details of an international meeting with them in Wellington for February 2004. Israeli speakers will include Ran Raz (Weizmann Institute), Victor Palamodov (Tel Aviv University) and Janos Makowsky (Technion). Ran recently spoke at the ICM. Shayne Waldron is arranging for some surface approximators to also speak. This should be an exciting meeting. Of course, speaking of meetings, the next big event on the horizon is ICIAM in Sydney next year, within which our colloquium is embedded. Remember we have allocated monies for support of this and look forward to your applications.

Eric Goles, a world renowned mathematician and computer scientist from Chile recently began discussions with us about exchanges and joint meetings. He is essentially the head of Science in Chile and is therefore very influential. He is very keen on developing binational links, especially in mathematical modeling. You should contact me if you are interested. I will keep you posted on developments.

At the colloquium we will see some new faces on the council. This is because three members have finished their terms. I would like to express the Society's thanks to Bill Barton, Robert McLachlan, and Graeme Wake for their efforts on our behalf. Also Charles Semple will remain on the council but not as Secretary, a position he has fulfilled for a long term. I hope to see you at the Colloquium in Auckland.

Rod Downey
Victoria University

LOCAL NEWS

AGRESEARCH

Since the last appearance of an AgResearch contribution I have attended the European Society for Mathematical and Theoretical Biology meeting in Milan, giving an invited talk in the symposium on `Recent Advances in Epidemic Modelling' and visited universities at Utrecht, Edinburgh and Oxford. While at Oxford I caught up with two kiwis(?), Rowland Kao and Andrei Korobeinikov. Not to be outdone, Tanya Soboleva visited INRA (Lille), Wageningen University and the Mathematical Biology group at the University of Dundee; and Kumar Vetharaniam visited UC Davis, and the Universities of Missouri-Columbia and Guleph, and attended the ADSA/ASAS/CSAS conference in Quebec, where he presented his models of lactation-nutrition interaction. It is reported that John Casti's seminars at Ruakura, made mathematics more attractive to quite a few biologists.

As I am moving to Albany in January 2003 this is my last dispatch. Ken Louie has volunteered to take over as the AgResearch correspondent for the NZMS.

Mick Roberts

UNIVERSITY OF AUCKLAND

Department of Computer Science

Dr Andre Nies has joined the Computer Science Department as a Senior Lecturer. Andre has interests in Theoretical Computer Science, notably Computational Logic. He was formerly at the University of Chicago.

At the New Zealand Mathematics Colloquium 2002, the NZMS Research Award was presented to Bakhadyr Khoussainov (via his wife Muharram). Cris Calude gave an Invited Lecture on "What is Turing's Halting Problem?".

Cris Calude's graduate text "Information and Randomness: An Algorithmic Perspective" has been published by Springer-Verlag in a second edition, much revised and extended, with Forewords by Gregory J. Chaitin and Arto Salomaa.

Seminars

- **Dr Andre Nies**, "Lowness properties of reals and randomness".
- **James Noble** (Victoria University of Wellington), "Patterns as signs".
- **Dr Arkadii Slinko** (Department of Mathematics), "When is a multiset ordering a Knuth-Bendix ordering?".
- **Chris Anderson**, "Animusic: a computer animation video album".
- **Dr Mark Titchener**, "The logistic zipper transform".
- **Professor Lutz Priese** (University of Koblenz), "Segmentation with the Color Structure Code (CSC)".
- **Professor Rick Mugridge**, "Test-driven development".
- **Ximing Qi**, "Process-based discrete event simulation".
- **Professor Britta Schinzel** (Koblenz University), "Medical imaging and its consequences".
- **Dr Franz J. Brandenburg** (University of Passau), "Computing and drawing isomorphic subgraphs".

Garry J. Tee

Department of Engineering Science

Andy Philpott and Mike O'Sullivan have been awarded personal chairs.

We have had two new Lecturers on deck from early September. For more information on Rosalind Archer and Charles Unsworth see the New Colleagues Section.

Andrew Pullan and Piaras Kelly have joined David Ryan on sabbatical leave.

Your correspondent has now been teaching courses in the Department of Mathematics at the University of Auckland over a period of 41 years, one year more than Hugh William Segar (Professor of Mathematics from 1894 to 1933).

Don Nield

Department of Mathematics

Vaughan Jones was made an Honorary Fellow of the London Mathematical Society on March 27-the LMS citation is published elsewhere in this Newsletter. The Department and the newly established New Zealand Institute of Mathematics and its Applications held a celebration for Vaughan on August 13, before the investiture in Wellington the following day, at which the Governor-General appointed him as Distinguished Companion of the New Zealand Order of Merit.

Sheena Parnell, who is the Departmental Teaching Fellow for this year, has been appointed as Tutor for The University of Auckland Tertiary Foundation Certificate Programme (formerly known as Wellesley Programme) from the beginning of 2003.

Jianbei An has been promoted to Associate Professor, Bruce Calvert has been promoted to Associate Professor, Colin Fox has been promoted over the Senior Lecturer bar with an extra increment, and Paul Bonnington has been given an extra increment in the Senior Lecturer scale.

The Marsden Fund allocation round for 2002 includes 22 research projects at The University of Auckland, providing them with more than $8.7 million over the next three years. The researchers include Rod Gover (Invariants in analysis and geometry, $100,000 per year) and Shayne Waldron (Surface approximation and visualisation, $50,000 per year). John Butcher has received funding from the NZIMA for a one-year programme in numerical analysis. A key component of this activity will be the ANODE 2003 workshop scheduled for 2003 July 14-18, and the additional funding will make it possible to extend the scope of that workshop in various ways. There will be some money available to assist visitors who wish to spend an extended period in Auckland. There are also funds available to support a one-year postdoctoral position in Auckland.

David Gauld spent a month of special leave in Dijon, Burgogne, France, working with Professor Szymon Dolecki. He gave there a seminar on "Torsion of the group of homeomorphisms of long line powers".

Rod Gover visited Tom Branson at the University of Iowa, Andreas Cap at the Erwin Schrödinger Institute in Vienna, Vladimír Soucek at Charles University in Prague, and Mike Eastwood at the University of Adelaide. Rod spoke at an Australian Mathematical Society meeting at Newcastle, and at the CMA National Research Symposium on Geometrical Analysis and pde at ANU.

Gaven Martin was a visiting Miller Professor at the University of California - Berkeley, where he participated in a Colloquium on The Hilbert-Smith Conjecture and Nonlinear PDEs.

Arkadii Slinko gave a talk "On Asymptotic Coalitional Manipulability" at the 6th International Conference of the Society for Social Choice and Welfare, held at Caltech; and on "Multisets and Utilities" (jointly with Murat Sertel) at the 2nd International Conference of the Society for Economic Design, held at New York, both in July 2002.

James Sneyd gave two invited talks at the Santa Fe Institute, as part of a conference on complexity in biology. As a result of those talks, Don Bers (Loyola University, Chicago) and James received funding from the Santa Fe Institute, to support a joint study of calcium dynamics in cardiac cells.

Jiling Cao and Mark Harmer have each been awarded a New Zealand Science & Technology Postdoctoral Fellowship by the Foundation for Research, Science & Technology. This is a three-year fellowship, which pays salary plus an additional amount for travel and other research expenses. Jiling will be based here from September 2002 to August 2005, mentored by David Gauld. Mark also intends to hold this fellowship here, working mainly with Boris Pavlov and Gaven Martin, but he will also spend some of the time working with others overseas.

Hyuck Chung has completed his PhD (supervised by Colin Fox), and he is now a post-doctoral fellow at the University of Illinois at Urbana-Champaign.

Congratulations to Renu Choudhary on being awarded a University Doctoral Scholarship.

Our secretary Min-Young Lee has won a University Staff Scholarship, to enable her to continue her studies for the Graduate Diploma in Business.

Professor Jari Kaipio (Kuopio University), who works on inverse problems and time series analysis, is visiting from September 2002 until May 2003. Dr Pierre Leone (University of Geneva), who works on numerical analysis and scientific computation, is visiting the Tamaki campus from September 2002 to July 2003. Steffen Schulz (Humboldt University, Berlin), who works on algebraic-differential equations, is visiting from November 2002 to July 2003. Professor Rob Wilson (University of Birmingham), who works on group theory, representation theory and computer algebra, is visiting from November 2002 until January 2003.

Recent visitors include Professor Kari Astala (University of Helsinki), Professor Chris Breen (University of Cape Town), Professor Jon Carlson (University of Georgia - Athens), Professor Derek Holt (University of Warwick), Doojin Hong, Professor Edgar Knobloch (University of Leeds), Professor Tsugunori Nogura (Ehime University), Professor Vladimir Oleinik (St Petersburg University), Dr Akiko Shima (Tokai University), and Professor William Ugalde (University of Iowa).

Mike Thomas and David Tall (of Warwick University) have edited "Intelligence, Learning and Understanding in Mathematics: A Tribute to Richard Skemp", published by Post Pressed, Flaxton, Queensland in 2002. That book of essays celebrates the life and works of Richard R. Skemp, pioneer mathematics educator, empirical researcher, textbook author, theoretical thinker and practical teacher, who was the first to truly integrate the disciplines of psychology, mathematics and education. It has contributions relating to Richard's work by Zoltan P. Dienes, Pierre van Hiele, Efraim Fischbein & Bracha Muzicant, Bruce Harrison, Gary Davis, Eddie Gray, Michael Mitchelmore & Paul White, John Olive & Les Steffe, David Pimm, Anna Sfard, Kaye Stacey & Mollie MacGregor, David Tall, Michael

Thomas, and two classic papers by Richard Skemp himself.

The New Zealand Mathematics Colloquium 2002 was held here, on December 2 to 5. Gaven Martin gave an Invited Lecture on "Automorphisms of lattices and tilings of hyperbolic 3-space, solving the Hurwitz-Siegel problem in 3 dimensions". Members of this Department gave the following Contributed Talks:

- **Willy V. Alangui**, "Stone walls and mathematics: searching for connections".
- **Jianbe An**, "Ugo's invariant conjecture for general linear and unitary groups".
- **Bill Barton**, "Undergraduate ESOL students: What difference does language make to their mathematics learning?"
- **C. Paul Bonnington**, "Toroidal triangulations are geometric".
- **John C. Butcher**, "Taking the right steps".
- **Bruce Calvert**, "Multiterminal resistors and monotonicity".
- **Robert Chan**, "Cheap computation of Hamiltonian problems in quadratic form".
- **Marston Conder**, "Regular Cayley maps for finite groups".
- **Jianhua Gong & Gaven Martin**, "Strongly quasiconformal homogeneity".
- **Rod Gover**, "Cartan, de Rham and quantum gravity".
- **Paul R. Hafner**, "Constructing the Higman-Sims graph".
- **Junying Huang**, "Implementation of stiff general linear method".
- **Vivien Kirk & Alan Champneys** (University of Bristol), "Wiggly homoclinic bifurcation curves near saddle-node/Hopf instabilities".
- **Pierre Leone**, "Numerical calculation to understand long-term qualitative behaviour of numerical solution of ODE".
- **Li-Chen Liu**, "Rankings of minisets of cardinality three".
- **Alastair McNaughton**, "Abel function transforms".
- **Nicolette Moir**, "Derivation of a class of ODE solvers".
- **Geoff Nicholls**, "Building and fitting a model of human language change".
- **Eamonn O'Brien**, "Constructing the automorphism group of a p-group".
- **Greg Oates**, "Integrating technology into undergraduate mathematics courses".
- **Ivan L. Reilly**, "Topological concepts and language".
- **Kieran Robert & Boris Pavlov**, "Resonance optical switch: calculation of the resonance eigenvalues".
- **Steffen Schulz**, "On circuit simulation and abstract differential algebraic equations".
- **Gabriela Slezáková**, "Obstructions to clustered planarity in directed graphs".
- **Arkadii Slinko**, "How large a coalition should be to manipulate an election?"
- **Jamie Sneddon**, "Obstructions to clustered planarity in directed graphs".
- **Steve Taylor**, "The boundary feedback stabilisation of a string-mass system".
- **Garry J. Tee**, "Solving elliptic partial differential equations, without factorization".
- **Krasimira T. Tsaneva-Atanasova**, "A mathematical study of systolic calcium oscillations".
- **Priscilla Tse**, "The Runge-Kutta-Munthe-Kaas method for the rigid body problem".
- **William Wright**, "Practical general linear methods".
- **Tskasa Yashiro**, "Crossing numbers of surface-knots".
- **Kaimin Zhang**, "The properties of *K*-subgroup".

Seminars

- **Professor William Ugalde** (University of Iowa), "Differential forms canonically associated to even-dimensional compact conformal manifolds".
- **Professor Tsugunori Nogura** (Ehime University, Matsuyama), "Non-normality numbers", and "Spaces with maximal selections".
- **Professor Jiang Shouli** (Shandong University), "Filter-Frechet vs. strongly filter-Frechet".
- **Moira Statham**, "Investigating the added value of the Wellesley Programme mathematics course".
- **Professor Charles Leedham-Green** (Queen Mary College, University of London), "Recognition of matrix groups".
- **Dr Akiko Shima** (Tokai University), "The 2-twist-spun trefoil has the triple point number four", and "State-sum invariants of classical knots".
- **Dr Jim Geelen** (NZMS Visiting Speaker, University of Waterloo), "An algebraic matching algorithm".
- **Dr Arkadii Slinko**, "Asymptotic properties of voting procedures".
- **Professor Edgar Knobloch** (University of Leeds), "Bursts".
- **Professor Chris Breen** (University of Cape Town), "Fear of mathematics".
- **Associate Professor Mike Steel** (University of Canterbury), "Phylogenetic trees and rapidly evolving diseases".
- **Assoc Prof Bill Barton & Prof Ivan Reilly**, "Topological concepts and Language".
- **Peter Fox** (Texas Instruments, Australia), "Graphic Calculator technology and pedagogical change".

- **Dr Jane Watson** (University of Tasmania), "Tasmanian research in chance and data".
- **Professor Derek Holt** (University of Warwick), "The Dehn function of nilpotent groups".
- **Professor Jon Carlson** (University of Georgia - Athens), "Classification of endo-trivial modules", and "Representation theory: the big picture".
- **Dr Maxine Pfannkuch**, "Development of students' statistical thinking: Designing a framework for research in the classroom".
- **Dr Paul Hafner**, "The graphs of Hoffman-Singleton and Higman-Sims".
- **Dr Jiling Cao**, "Pseudocompact spaces and Ginsburg's questions".
- **Shehenaz Adam**, "Ethnomathematics in the Maldivian curriculum".
- **Dr Nicholas F. Dudley Ward**, "The zero set problem for the Bergman spaces", and "Wavelets".
- **Mala Nataraj**, "Vedic mathematics", and "Mathematics in South Indian classical music".
- **Dr Sina Greenwood**, "Type I manifolds".
- **Viliami Latu**, "A case study of two Pacific Island senior mathematics students: Is their motivation shaped by their culture?"
- **Jerry Lane**, "Mathematics and local government".
- **Professor David Gauld**, "Long line knots".
- **Willy Alangui**, "Back from the field: Searching for connections between stone walls and mathematics".
- **Carolyn Vela**, "Computers and internet use in primary mathematics".

Garry J. Tee

Department of Statistics

Mik Black has arrived as a Lecturer: see the item about him in the New Colleagues Section.

Andrew Sporle will be employed for the next four years on a Uniservices contract, working with Alastair Scott and Peter Davis on a PGSF-funded project. The project will be investigating innovative ways of using routine data, to monitor family and whanau well-being over time. Andrew is a quantitative sociologist who has been, amongst other things, Maori Health Research Manager for the HRC, Research Fellow in the Departments of Preventive and Social Medicine at the University of Otago and of Public Health & General Practice at the Christchurch Medical School, and a part-time lecturer in Maori and Pacific Health at Auckland. Welcome to the department, Andrew!

Chris Wild will be Head of Department, after Alan Lee finishes his term at the end of January 2003.

Monique Mackenzie, a PhD student in this Department, has just landed a tenure-track lectureship in the Maths/Stats department at St Andrew's University in Scotland. Her thesis, on the use of parametric and innovative semiparametric non-linear mixed models in forestry (supervisor Brian McArdle) is still incomplete, and so the pressure is on to finish. She did her MSc thesis (also on parametric non-linear mixed models for forestry growth data) in the School of Biological Sciences, then moved up to Statistics at the same time as Brian McArdle. Monique and Carl Donovan, another of Brian McArdle's PhD students, were married on 2002 November 30th and both will go to St Andrew's, where there is a strong probability of Carl being given a Post-Doc. This event strengthens the already strong ties between the Wildlife and Ecology Statistics group at St Andrew's and the corresponding group in the Department of Statistics at Auckland.

There is a lesson here for the administrations of New Zealand Universities. Monique was interviewed by video conferencing at 8.30 pm in NZ (9.30 am in St Andrew's), and she had the job offer by 8.00 the next morning.

Seminars

- **Markus Neuhauser** (University of Otago), "Adaptive interim analyses with application to a weighted location-scale test".
- **Dr Jock MacKay** (University of Waterloo), "What is statistical method?"
- **Dr Mik Black**, "Statistical issues in the design and analysis of spotted microarray experiments".
- **Dr Granville Tunnicliffe-Wilson** (University of Lancaster), "An extension of vector autoregressions".
- **Professor Rafail Khasminskii** (Wayne State University), "On on-line estimation of a smooth regression function".
- **Professor David Vere-Jones** (Victoria University of Wellington), "Entropy scoring revisited: a second look at assessing point process forecasts".
- **Dr Paul Murrell**, "STATS 220: Some lessons learned about Web-based teaching".
- **Professor Raymond J. Carroll** (Texas A&M University), "Variability is not always a nuisance parameter".

Applied Probability & Applied Mathematics Joint Seminars

- **Professor Edgar Knobloch** (University of Leeds), "Structurally stable heteroclinic cycles in Rayleigh-Benard convection".
- **Dr Alona Ben-Tal** (Bio-Engineering Institute), "Towards a mathematical model for cardio-respiratory systems".
- **Dr Don McNickle** (University of Canterbury), "Some aspects of correlations in queues".
- **Professor Ezra Zeheb** (Technion, Haifa), "Control of systems under uncertainty condition".
- **Paul Shorten** (AgResearch, Ruakura), "Predictive modelling of populations growth, spread and competition. From food/crop safety to GMO risk".
- **Dr Charles Semple** (University of Canterbury), "Combining evolutionary trees with dated ancestors".
- **Golbon Zakeri** (Engineering Science), "Estimation of market distribution functions in the electricity market".
- **Dr Sean Oughton** (University of Waikato), "Heating the solar atmosphere: from 6000 Kelvin to a million Kelvin using wave-driven turbulence".
- **Will Wright** (Department of Mathematics), "General linear methods with inherent Runge-Kutta stability".

Garry J. Tee

UNIVERSITY OF CANTERBURY

Department of Mathematics and Statistics

Congratulations to Jean Zhaojing Gong who has been awarded a New Zealand Institute of Mathematics and its Applications (NZIMA) PhD scholarship for 3 years. Jean's thesis is entitled "Improved statistical methods for modelling health outcomes - application to clinical efficacy and equity of access". Jean's supervisor will be Irene Hudson with Patrick Graham (Christchurch School of Medicine and Health Sciences, University of Otago) as associate supervisor.

Graeme Wake and Mark McGuinness (Victoria University of Wellington) are co-leading an international team of four, charged with developing a post-graduate program in the well-known Industrial and Applied Mathematics in the Korean Advanced Institute for Science and Technology over the next 3 years. This will involve industrial problem workshops. The other team members are from Australia and Canada. Funded by KAIST, this will be a major initiative for the region and it is intended to develop links with the newly formed Centre for Mathematics in Industry established recently by Massey University on their Albany campus. Involvement with the Australian based Mathematics in Industry study groups which shift to New Zealand for a period from early 2004 will also be facilitated. As with Industry here, the Korean interest includes problems from the biological, environmental and medical areas. The NZ members will visit for periods of one or two months to fit in with their commitments here.

Professor Phillippe Toint, University of Namur, Belgium, will be a Visiting Erskine Fellow to the Department from 31 January until 30 April 2003. Professor Toint will be giving a series of lectures as part of the 4th year Optimization paper, and research seminars. Professor Toint is Professor of Mathematics, co-ordinator of the Numerical Analysis Unit, and Director of the Transportation Research Group at Namur. He is an international figure in optimization and will be lecturing on Trust-Region Methods, the work in his book (SIAM, 2000). Further information on Professor Toint including publications may be found on his web page http://www.fundp.ac.be/~phtoint/toint.html

Seminars

- **Professors Peter Hilton and Jean Pedersen** (Binghamton University, State University of New York, and Santa Clara University), "The Birth of Homological Algebra", "Preliminary Talk on Paper-Folding", "Paper-Folding and its Relation to Geometry", "New Results in Elementary Number Theory Derived from Paper-Folding", "The Polya Enumeration Theorem and Polya Homologues".
- **Jeremy Levesley** (Leicester University), "Approximation on Spheres".
- **Professor Tim David**, "Activation and Extinction Models for Platelet Adhesion".
- **Britta Basse**, "Cell cycle modelling of human melanoma tumors".
- **Professor John Casti** (Santa Fe Institute and University of Vienna), "The Geometry of Data" and "BizSim - the uses of complexity science in the world of business and simulation".
- **Dr G. Tunnicliffe Wilson** (Lancaster University), "Modelling Statistical Extremes", "The Kalman Filter", "Spectral Analysis", "Extended Autoregressive Models".
- **Peter T. Cummings** (Vanderbilt University and Oak Ridge National Laboratory), "Visualizing Complex Physical and Chemical Phenomena at the Molecular Level".

- **Dr James Geelen** (University of Waterloo), "An algebraic matching algorithm".
- **Professor Rod Downey** (Victoria University of Wellington), "Parameterized Complexity: recent thoughts".
- **John Haywood** (Victoria University of Wellington), "Improved parametric models for evolutionary seasonal patterns or other cycles".
- **Rua Murray** (University of Waikato), "A `minimum energy' approach to invariant densities in dynamical systems".
- **Philip Meguire**, "New Foundations As Seen from the Boundaries".
- **John Crequer** (Statistics New Zealand), "Benchmarking with the Kalman Filter".
- **Adjunct Associate Prof Rey Casse** (University of Adelaide), "Finite geometry and secret sharing schemes".
- **Bruce van Brunt** (Massey University), "Holomorphic Solutions to Advanced Functional Differential Equations and Complex Dynamics".

Charles Semple

INDUSTRIAL RESEARCH LIMITED

Applied Mathematics Team

Graham Weir was elected as a Fellow of the Royal Society of New Zealand in November. The citation reads as follows: " Dr Weir has applied mathematics to practical problems of considerable importance to New Zealand. He has made significant contributions to our understanding of mineral exploration, granular flows in industrial processes, underground storage of greenhouse gases, and lahar flows." Most applied mathematicians, and many pure mathematicians, will be aware of the quality of Graham's work and of the leadership he brings to New Zealand Mathematics.

We have two summer students with us this year. Joanna Atkin returns this summer, after completing her BSc(Hons) in Physics at Victoria. Joanna will be working with Shaun Hendy on modelling the formation of oxide films. Heremaia Tangihaere has just completed his BSc in Maths and Physics at Waikato. Heremaia will be working mainly with John Burnell on geothermal modelling.

Roger Young is an Associate Investigator on one of IRL's successful Marsden bids this year entitled "Bridging length scales: the application of crystal plasticity to metal fatigue." The Principal Investigator is Dr David Knowles from the Materials Performance Technologies Team at IRL.

The MacDiarmid Institute high-performance computing facility is up and running at Applied Maths. The new computer, hoiho.irl.cri.nz, is a rack-mounted 46-node Linux cluster and will be used by materials scientists in the CoRE to model materials and analyse experimental data. There will be some CPU time available for external users - for further details contact Shaun Hendy (s.hendy@irl.cri.nz).

Graham Weir gave a poster on "Hopper Discharge" at the AIChE meeting in Indianapolis in November. Steve White attended a meeting in Kyoto, GHGT6, on Greenhouse Gas Reduction and the annual meeting of the American Geological Union in Denver. Graham Weir and Shaun Hendy attended the Manawatu-Wellington Applied Maths Meeting. Shaun gave a talk on "Mathematical Modelling at the MacDiarmid Institute for Advanced Materials and Nanotechnology."

Shaun Hendy

MASSEY UNIVERSITY

Institute of Fundamental Sciences (Palmerston North)

Mathematics

Semester 2 (13 weeks) has been a busy time with only one week `break' as we had many Extramural courses running so as a matter of fact we did not have a break at all! It is rather surprising that we could not have a break of two weeks as in Semester 1. There was a day of intersection for the courses and thanks to the generosity of the Institute this fact was celebrated with a lunch for the Mathematics students and staff.

Robert McLachlan has just pulled off a unique treble. Not only has he gained a Personal Chair this year, together with money from Marsden Fund, but also recently he was elected a Fellow of Royal Society of New Zealand. Congratulations Robert!

Also congratulations to Igor Boglaev who has been promoted to Associate Professor.

And finally our congratulations to Margaret Walshaw of the Department of Technology, Science and

Mathematics Education who has been granted \$100,000 to investigate what growing up and succeeding at school means for young women in today's changing professional world. Jonathan Marshall's contract as a Tutor has been extended by a year.

Robert McLachlan writes that he can see a birch tree, a little corner of sky, and a huge snow bank from his basement office in Oslo. He gave a series of lectures at the Summer School on Geometric Integration in Fevik (on the "Norwegian Riviera"), another in a converted pigsty in the middle of Norway, and spoke at the Workshop on Innovative Integrators for PDEs at the CWI in Amsterdam.

Professor Jim Geelen (University of Waterloo) visited us for a few days in late September as the New Zealand Mathematical Society Visiting Speaker. We enjoyed his company and his very interesting seminar (see under seminars).

Peter Kelly attended two conferences at the beginning of July held in Auckland. These conferences were: "The Bridging Mathematics Network 10th Conference, 2002, and MERGA 25".

Mike Carter, Tammy Smith, Kee Teo and Gillian Thornley received a grant from Massey's Fund for Innovation and Excellence in Teaching to produce web-based Algebra (review) tutorials for Science, Technology, Agriculture and Business students.

On the last day of the extramural week, Massey hosted the 5th Manawatu-Wellington Applied Mathematics Conference. The event was organized by Igor Boglaev and Marijcke Vlieg-Hulstman. There was a good attendance and many interesting talk. We like to thank the NZ ANZIAM branch for sponsoring the morning-and afternoon teas. It was good to see members coming as far north as Auckland (John Butcher) and as far south as Christchurch (Graeme Wake).

Tammy Smith has spent a fortnight in Melbourne at the CSIRO Health Sciences and Nutrition, Parkville working with Vidana Epa, Structural Biology.

It is unfortunate that many of us will not be able to attend the Colloquium 2002 hosted by the University of Auckland. Semester 3 has already sprung upon us and many of us are involved in some ways or are on leave such as Robert McLachlan and Kee Teo or have other engagements.

John Hudson, Charles Little, Serguei, Keeta (latest PhD student of Charles), Barbara Holland, Paul Gardner and James Matheson (to be enrolled next year to start a PhD with Mike Hendy) will be attending the NZMRI Workshop on Combinatorics and Combinatorial Aspects of Biology held at New Plymouth, January 4-11, 2003.

Kee Teo left a few weeks ago for Singapore (mid-November to mid-February) to work with Professor Koh of the National University of Singapore and Associate Professor Dong of Nanyang Technological University on Chromatic Polynomials. The bad thing is that it is here very quiet without Kee but the good thing is that he did not get lost on the way and safely arrived in Singapore on the scheduled time. And as Kee wrote: "The plane did not lose any parts...".

Charles Little, Serguei and Sven Hartmann (Information Systems) will be attending the 27th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing held at the University of Newcastle during December 9-13, 2002.

The Allan Wilson Centre for Molecular Ecology and Evolution (AWC) is now well under way, with several of its members being from IFS. Mike Hendy as a co-director, together with PhD student Paul Gardner and computer specialist Tim White, have been relocated to the top of Science Tower D, to join the biological science members of the AWC at Massey. Our former PhD student Barbara Holland, has returned from a year in Germany, having just been awarded a three-year NZS&T Postdoctoral Fellowship. Several new mathematics PhD students and post-docs are expected to join them over the next few months. Their new computer laboratory is now full of with visitors and several summer students joining the crew. At the time of writing, the AWC's parallel computer facility, "Helix", a Beowulf cluster of 66 dual processors is being commissioned. The computer scientists at Massey's Albany campus have constructed this facility. It has already been benchmarked as #304 in the world top 500 rankings (see http://www.top500.org/list/2002/11/) with a LinPak test run of 234.8 Gflops, more than twice the speed of the next reported NZ computer. Several of our members have programs ready to implement on Helix; the race is on to see who will be the first to produce some useful results.

An introductory training course will be run at Albany January 28-31, and will be open to other potential research users in the NZ mathematical community. Applications to attend this course should be made to our Business Manager, Susan Wright (S.M.Wright@massey.ac.nz). Potential attendees should see the website http://iims.massey.ac.nz/events/helixworkshop.html for details, which include grants to students who do not have acess to funds to attend.

Professor Judith Kinnear (Deputy Vice Chancellor of the University of Sydney) has been appointed as our new Vice Chancellor and is expected to take up the position early next year. Although she will be based at the Palmerston North campus, Professor Kinnear is expected to be a regular visitor to Wellington and Auckland.

Seminars

- **Professor Mike Hendy**, "Undergraduates solve century-old prime number problem".
- **Associate Professor Sven Hartmann** (Information Science Research Center & Department of Information Systems), "Orthogonal double covers of complete graphs".
- **Professor Jim Geelen** (New Zealand Mathematical Society Visiting Speaker, University of Waterloo, Canada), "An algebraic matching algorithm".

Graduate Seminar Series

- **Associate Professor Igor Boglaev**, "Uniform multidomain decomposition for solving convection-diffusion problems".
- **Dr Kee Teo**, "Zeros of chromatic polynomials".
- **Dr Bruce van-Brunt**, "Holomorphic solutions to advanced functional equations".
- **Paul Gardner**, "Optimality in the RNA-world".
- **Dr Marijcke Vlieg-Hulstman**, "On the remarkable Korteweg-de Vries equation-a brief survey of results".
- **Padma Senerath**, "Randers metric".
- **Adrian Kitson**, "On the homotopy and the homoly groups of the classical Lie Groups".
- **James Matheson**, "Domain decomposition for singularly perturbed problems".

Marijcke Vlieg-Hulstman

Institute of Information and Mathematical Sciences (Albany)

Mathematics

Dr Carlo Laing has recently been appointed as a lecturer in the Institute. For more details see the New Colleagues section later in this issue.

Dr Mick Roberts, currently with AgResearch at Wallaceville (Hutt Valley), will join the Institute as Associate Professor of Mathematics from January. Mick has an international reputation for his research as a mathematical biologist. His recent work is in mathematical modelling of epidemics, but he has experience in other applied mathematics applications as well.

Leng Leng Lim has arrived to start a PhD in Mathematics. She has been teaching for the last few years at Singapore Polytechnic but is not a stranger to NZ, having taken out degrees from Waikato and Canterbury.

Professor Kewal Puri has headed off back home to Maine after spending the semester with us. It was a pleasure to have Kewal here; he helped with teaching some Mathematics postgraduate papers, took part in research discussions with several staff, and left us with memories of his good humour and graciousness.

A newly-formed Centre for Mathematics in Industry (CMI) is now based in the Institute of Information and Mathematical Sciences. It will initially "sit" alongside the already-established Centre for Mathematical Modelling (CMM), although the CMI may well subsume the CMM in due course. The Director of the CMI is Robert McKibbin, while membership is open to all who consider that all or any part of their activity could be included under the generic title of applied mathematics with industrial applications. As mentioned above, Graeme Wake will take up a position as Adjunct Professor of Industrial Mathematics from March next year; he will be based in the CMI.

Preparation for two major industrial mathematics meetings to be held in Auckland, the Mathematics in Industry Study Groups, MISG2004 and MISG2005, will be focussed within the CMI. It is anticipated that Graeme Wake will be the Director of these two events. The MISG is a Special Interest Group of ANZIAM (Australia and New Zealand Industrial and Applied Mathematics) which is a division of the Australian Mathematical Society.

The MISG meetings take the form of workshops where industrial problems are brought for tackling by applied mathematicians and others who like to do such things. Attendance is free, the costs being borne by the industries who offer their problems. Needless to say, a lot of work has to be done to prepare the ground for the workshops, and this is where the CMI and Graeme Wake come in. There will be

opportunities to get leverage off the industry connections established for the MISG to make contacts in other scientific areas, so keep your eyes open!

The "roof shout" for our new building took place last week. The clean-up process is already under way, with the large site-crane being dismantled. The Mathematics and Statistics groups will move "up the hill" in the first week of the New Year.

Seminars

- **Philip Sharp** (University of Auckland), "The restricted three-body problem and its periodic solutions".
- **John Butcher** (University of Auckland), "Numerical methods for ordinary differential equations in the 20th century".
- **Mick Roberts** (AgResearch, Wallaceville), "Bandung bugs (The dynamics of dengue) Speaker".
- **John Butcher** (University of Auckland), "Numerical methods for ordinary differential equations in the 20th century".
- **Ron J Litchford** (NASA), "Future Space Transportation: A Propulsion Research Perspective".

Mike Meylan

UNIVERSITY OF OTAGO

Department of Mathematics and Statistics

Since the last Newsletter most of the department has been incredibly busy. Have you ever noticed how you promise yourself that next year will be easier and it never is? Well 2002 has been the year of all years. We knew of course that the department was going to be reviewed, and Vernon knew about the IAHR conference he was co-organizing, but who would have ever guessed that it was going to be quite as crazy a year as it has turned out.

First the conference - the 16th International Association of Hydraulic Engineering and Research Symposium on Ice. Due to take place in two days as this is being typed, this has involved the production of about 1000 pages of Proceedings to be handed out to the delegates at the conference itself. (Never, ever agree to host a conference that produces a reviewed Proceedings at the time of the conference.) What started out as a nice pleasant get-together of a few friends and colleagues, has turned into something three times the expected size with people attending from Mongolia, China, Japan, Svalbard, Russia, Finland, Norway, Sweden, ... I'll stop but the list goes on and incudes 17 countries. Each person has their own special needs and each doesn't like something! Producing the Proceedings was interesting to say the least. Despite a very clear set of instructions, nobody gets the prize for reading instructions and sticking to them. Manuscripts came in every shape and form including those that crashed Vernon's computer as soon as he tried to open them, and those that were so big that they needed a Cray to display the figures. Making pdf usually saw Vernon turning a screwed up face slightly away from the screen waiting for the crash, which for one out of ten manuscripts required a reboot. Incredibly after a weekend of continuous work the Proceedings got to the Printery, and, what's more, they look great. More next newsletter, but we are hopeful the 16th IAHR Symposium on Ice will be remembered by many as a great conference.

The review was the other pressure that took up a lot of time. Artfully Vernon persuaded Derek that he would enjoy coordinating the preparation of the self-review (something Derek had artfully achieved for the previous review in 1993). Derek did a grand job and took a lot of pressure off Vernon. While Vernon still wrote plenty of dulcet prose, he didn't have the worry of chasing people for their contributions and compiling it. Derek's beard is noticeably grayer for all the work he put in and Vernon now looks all of his 42 years. The actual review went well. The committee were very friendly and very positive and all staff came away from it feeling as though the department was in pretty good shape. Some recommendations were made orally but since these are not yet on paper, we shall wait until next time to tell you what we intend to do.

One item of great news this semester is that Richard Barker was made an Associate Professor. It was well deserved and we are all pleased for him. The Chair of Statistics still remains unfilled but we are hopeful it will be filled soon so that the statistics group can reach its full potential again. Vernon's research for the last several months has involved the challenge of repositioning pieces of paper from the left to the right side of his desk and then back again-oh and editing the Proceedings mentioned above. Fortunately, Tim Williams, a Marsden research student, is doing great things and Gareth is close on producing something interesting too.

Christmas is coming, just need to get that conference behind us, and we can relax.

Richard Barker attended The Wildlife Society annual meeting in Bismarck, North Dakota, to take part in

a symposium on application of modern regression methods in wildlife biology. While in the States he took the opportunity to spend a week with Bill Link at the Patuxent Wildlife Research Center in Maryland and also a few days with Gary White at Fort Collins, Colorado.

Peter Fenton visited John Rossi at Virginia Tech for a month during June-July, to continue joint work on a problem in subharmonic functions.

Dr Markus Neuhäuser has been awarded a University of Otago Research Grant in 2003 for a project on studies with adaptive designs, i.e. studies with one or more adaptive interim analyses. These are becoming more and more popular, in particular in clinical research. In this research project it is planned to investigate the usefulness of adaptive methods in different areas. He has also been invited to join the Editorial Board of Communications in Statistics from January 2003.

The Problem Challenge competition, run by John Curran and John Shanks, continues to flourish with over 42000 Intermediate School children entering this year. Despite the extra entries the setters suspect that the standard has increased slightly. The competition comprises five sets of questions each with five questions to be answered in thirty minutes. The two Johns had to set a really tough last set to avoid severe bunching at the top. For the fourth year they have also run the end-of-year Final Challenge competition for the more able children, and having set some really "challenging" questions, they were yet again amazed that there were two perfect scores, and an outstanding result from a child only in year 5. It would be good to follow the progress of these top students and try to veer them towards a mathematical training.

Derek Holton has provided the following comments on his study leave in the first half of this year.

"My wife is glad that I've become interested in mathematics education. She says they have better conferences than mathematicians. What she means by this is that they seem to contrive lavish accommodation in exotic spots. While combinatorialists seem to restrict themselves to university venues at largely college accommodation, in the last couple of years maths education has taken me to Tokyo (where she who counts' was impressed by the shopping) and the Kruger National Park (blown away by the wildlife). Naturally I have devoted myself to the conferences and to me there is no difference between how I work at a graph theory conference or a maths education one. Though I have to say that watching through a window as a hippo pulls itself onto a bank does prove to be somewhat of a distraction when you're trying to give a serious paper.

"In the first six months of this year I was on leave for three months in Melbourne and three months in England. My wife's standard of maths education conferences was not reached at the University of Reading where I spoke at the Maths Association's annual conference. Nor did it help me one evening as we got a taxi downtown for a meal that we were pulled over by a member of the local constabulary. Despite having ordered the taxi through the hotel where we were staying, the cab was apparently unlicensed. It transpired that our driver had somehow managed to intercept the hotel's call and was whisking us off, hopefully, for just the gain of the fare.

"In fact crime seemed to dog us during our period in the Northern Hemisphere. Now I should just point out first that I always tell my wife that she tries to stuff too much into her purse. OK, so she took a side trip to Moscow. (I, of course, stayed in England slaving away on my latest publication.) She somehow got isolated from her tour group during an investigation of the Moscow underground stations, and found herself surrounded by young gypsies. They had quickly discovered that she had a `bum' bag around her waist and were doing their best to check out its contents, presumably just in case she had forgotten to put something in it. But, although they had got the zip undone, their perusal of the contents was hampered by the fact that the valuables were jammed in tight.

"At about this point a passing Moscovite found a novel use of a laptop. Swinging it round his head he advanced on the light-fingered group and drove them off. No one was the worse for wear, though the state of the laptop has never thoroughly been discussed. However, I am told that Moscow is not on my list of venues for a conference of any type.

"But equanimity was regained on the way home when we just happened to find a conference in Crete. We were more than adequately housed in what was a resort rather than a hotel. Several swimming pools spread themselves around the environs and the Mediterranean lapped on a small but adjacent beach. I managed to find one day, after the conference I might add, to lay on the reclining chairs, under the sun umbrellas. I even found the courage to go for a swim. My wife and I were never contenders for an Olympic medal and we watched the waves for a while before venturing off. We had noticed several people a little distance out, apparently resting on a reef. So we decided to go out and join them. On the way we very quickly noted the rapid increase in the depth of the water but we knew there was a reef so why worry. But there was no reef. We suddenly realised that these people who we thought were standing with their feet on a reef were just standing up. You could actually `float' vertically in the water. It was a weird feeling. The salt concentration was obviously sufficiently high that it rendered the arm and leg

movements usually required to keep a body afloat, unnecessary. "I won't dwell on the apré-swim delights of men delivering food and drink to your own individual chair and umbrella, nor the heat of the sun or the warmth of the water. Suffice to say that since my return, Dunedin's air temperature has failed to move the mercury as high as the water temperature that day in Crete.

"If any of you are tempted to change disciplines as the result of what I've just said, you might like to consider coming to the Delta '03 conference in Queenstown from November 23 to 27 next year. The conference is in a hotel, Rydges, bordering the mighty Lake Wakatipu and you can be assured of a stimulating period deliberating the virtues and difficulties of mathematics education at university level."

Visitors

Dr Alan Beardon and Mrs Toni Beardon, both of University of Cambridge, England, visited the Department during October and November. Alan worked with Peter Fenton on Geometric function theory, discrete groups, complex dynamics and mathematical economics while Toni worked with Derek Holton on mathematical education. Both Alan and Toni are keen walkers and took the opportunity at weekends to view as much as they could of our scenic South Island.

Seminars

- **Gareth Hegarty**, "Large amplitude periodic waves beneath an ice sheet".
- **Toshikazu Kimura** (Graduate School of Economics, Hokkaido University, Japan), "Diffusion approximations for queues with markovian bases".
- **Paul R. Wade** (National Marine Mammal Laboratory, Alaska Fisheries Science Center, Seattle), "Population dynamics and extinction risk of the southern resident killer whale population (Washington and British Columbia): environmental variability or human impacts?"
- **Dr Paul Yip** (University of Hong Kong), "A unified approach in estimating population size of capture-recapture experiments in continuous time".
- **Dr Ted Catchpole** (Australian Defence Force Academy), "Modelling the dynamics of a simple large mammal population is not simple".
- **Marti Anderson** (University of Auckland), "Canonical analysis of principal coordinates: a new point of view".
- **Mark Hickman** (The University of Canterbury), "From black holes to braided rivers or matching curves under the projective group".
- **Darryl MacKenzie** (Proteus Research & Consulting Ltd, Dunedin), "Was it there? Analysing species presence/absence data with imperfect species detection".
- **Dr John Enlow**, "Mathematical modelling of liquid crystal structures".
- **Markus Neuhäuser**, "A comparison of adaptive procedures and the truncated product method".
- **Professor George Seber** (Department of Statistics University of Auckland), Special Guest Speaker for Dunedin Statistical Association, "Do statisticians count more than sheep?"
- **Professor Jim Geelen** (University of Waterloo, Canada) NZMS Visiting Speaker, "Multicommodity flows".
- **Laimonis Kavalieris**, "Estimating the frequency of oscillation from time series data".
- **Ari Samaranayaka**, "Effect of environmental variation on models for the dynamics of biological populations".

Mathematics Honours: Project Presentations -

- **Katie Enlow**, "Simultaneous polynomial root finding using circular arithmetic".
- **James Douglas**, "On some properties of the ring of linear transformations on a vector space".
- **Tim Woodhams**, "Modelling sex-ratio altering selfish genetic elements in the Z-W sex chromosome species".

Statistics Honours: Project Presentation -

- **Vanessa Cave**, "Matrix population models".

StatChat is a regular series of informal presentations on key ideas in statistics aimed specifically at graduate students from other Departments (and interested staff) as well as from the Department of Mathematics and Statistics. StatChat to be led by a statistician, with the participants (including other statisticians) contributing to the discussion.

- **Joanne McKenzie and Jim Lewsey** (Department of Preventive and Social Medicine, Otago University), "Model selection methods: Is stepwise unwise?"
- **Warren Palmer**, "QTL Distributions".
- **David Fletcher**, "The beauty of logarithms in ANOVA for skewed data".
- **David Skegg** (Department of Preventive and Social Medicine), "Statistics and epidemiology: a

productive marriage?"
- **John Williams** (Department of Marketing), "Structural equation models for heterogeneous data: a finite mixture model approach".

This talk is one in a series run by the Otago Branch of the NZSA

- **Mark Schreiber** (Bioinformatics/ Statistics, AgResearch), "The statistics of biological sequence analysis".

Lenette Grant

UNIVERSITY OF WAIKATO

Department of Mathematics

We congratulate Rua and Michelle on the birth of their first child. Their daughter Alison was born on 3 November and she weighed 3.26 kg (7lb 4oz).

Congratulations are also due to Sivajah Somasundaram who won the B.H. Neumann Prize for the most outstanding talk presented by a student at the Annual Meeting of the Australian Mathematical Society. The title of her prize-winning talk was \textsl{A Gateaux differentiability space that is not weak Asplund}. It was sad to learn that Professor Neumann passed away just a few weeks after presenting the prize to Sivajah.

We also congratulate Ian Craig, Sean Oughton, and Alfred Sneyd on their recent successful application for a Marsden grant. They have received a three-year grant for their project *Magnetic reconnection and turbulence in solar coronal plasmas*.

Rua is still on study leave, but as may be inferred from above, is physically in Hamilton. Also still on study leave is Kevin Broughan who is due back from New York on Christmas Day.

Recent travellers in the department have been Ernie Kalnins who attended the *IV Workshop on Classical and Quantum Integrable Systems* held in Cuernavaca (about 85 km south of Mexico City). On a separate trip, Ernie went to the *University of Queensland Mathematical Physics Workshop* held in Coolangatta. Also crossing the Tasman were Warren Moors and his student Sivajah (mentioned above) who attended the *46th Annual Meeting of the Australian Mathematical Society* in Newcastle. Stephen Joe and Frances Kuo attended the *Fifth International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing* which was held in Singapore.

Ernie, Alfred, Warren, Sean, and Rua will be attending the mathematics colloquium coming up at the University of Auckland.

Seminars

- **M. Domijan**, "Applications of fixed point theorems to ordinary differential equations".
- **S. Joyce**, "Applications of the Baire category theorem to Fourier analysis and the non-differentiability of continuous functions".
- **F. Kuo**, "Constructing good lattice rules with millions of points-an overview of recent developments".
- **C. Voysey**, "Viscous damping of periodic water waves".
- **G. Blacklock**, "Consumer theory".
- **J. Geelen** (University of Waterloo, NZMS Visiting Lecturer), "An algebraic matching algorithm".
- **J. Butcher** (University of Auckland, NZMS Visiting Lecturer), "Numerical methods for ordinary differential equations in the 20th century".
- **J. Butcher** (University of Auckland, NZMS Visiting Lecturer), "Some new methods for stiff and non-stiff problems".
- **A. Jaballah** (University of Sharjah, UAE), "Integral domains with only finitely many overrings".

Stephen Joe

VICTORIA UNIVERSITY OF WELLINGTON

School of Mathematical and Computing Sciences

Rob Goldblatt visited China in August, serving as the NZ delegate to the General Assembly of the International Mathematical Union in Shanghai before attending the International Congress of Mathematicians in Beijing. He then travelled to the city of Chongqing in the south-west where he was an invited speaker at the 8th Asian Logic Conference.

At the end of September Rob was in France as an invited speaker at the conference Advances in Modal Logic 2002 held in Toulouse. Later he spent the month of November as a visiting fellow at the University of Bolonga, where he gave two series of lectures, on modal logic and on nonstandard analysis. During this time he also gave a lecture in Pisa at a conference on "I Numeri Infinitesimi".

Yu Hayakawa has agreed to take on the role of Programme Director for Statistics and Operations Research for two years starting 1 December. Megan Clark has stepped down after many years of much-appreciated service.

Zoe Edward has been appointed by Continuing Education to teach the new Foundation Studies course in Mathematics and Statistics over the summer (Lyndon Smith will be teaching the Computer Studies course in that program). Zoe has Masters degrees in operations research from Sussex and Claremont Graduate School, plus considerable teaching experience, and will have an office in the School from October.

Estate Khmaladze (`Local point processes in the neighbourhood of sets'), Geoff Whittle (`Matroid Minors'), and Matt Visser (`How generic is Einstein's theory of general relativity?') have Marsden grants for 2003-5. This represents a remarkable level of success by many standards: it constitutes half the Marsden successes for VUW in this round, and $846,801 in external research income, that is, 37% of the total MIS panel grants for the round. Matt is also an Associate Investigator on a second Marsden funded through the Physics and Engineering panel, working with David Wilshire at Canterbury.

It is a pleasure to acknowledge the appointment of Ian Welch to Lecturer in Computer Science and to Barry Blundell as Senior Lecturer in Computer Science. Barry is currently at Massey University at Albany and works in 3-d visual displays among other things. Ian is currently completing a PhD at Newcastle, UK in security protocols and will start in January.

Rod Downey has a Maclaurin fellowship for next year, and the CLLC Logic Colloquium funded by NZIMA will be directed by Rob Goldblatt.

Bill Naylor is employed to teach COMP 103 Data Structures and algorithms over the summer. Bill has his PhD from Bath and has been a PDF at Western Ontario, working on mathematical mark-up languages (MathML) and computer algebra systems (Maple, Aldor).

Mark McGuinness is spending some time at the Applied Mathematics Division, Korean Advanced Institute of Science and Technology, in Taejon in South Korea. Mark is part of a team, including Graeme Wake from Canterbury, John Donaldson from Tasmania, and Henning Rasmussen from Western Ontario, who are flying the flag for Industrial Applied Mathematics for a shared three-year period at KAIST. The position involves a little graduate teaching, and plenty of opportunity for research, in a university that has a strong engineering emphasis. The team was formed quite by chance, when all four of us were at the Oxford Centre for Industrial Applied Mathematics at the same time late last year.

Seminars

- **Dr Carmen Molina-Paris** (Department of Applied Mathematics, University of Leeds), "Mathematical model of T-cell activation".
- **Dr Olivier Basdevant** (Reserve Bank of New Zealand), "On applications of state-space modelling in macro-economics".
- **Dr Granville Tunnicliffe-Wilson** (Lancaster University), "Prediction theory and practice".
- **David Boland**, "The Future of Operational Research, in the Post Modern Workplace".
- **Professor Timothy Budd** (Oregon State University), "Multiparadigm Programming in J/MP".
- **Professor Jim Geelen** (Department of Combinatorics and Optimization, University of Waterloo, Ontario), "An algebraic matching algorithm".
- **James Noble**, "Patterns as Signs".
- **Liyanage De Silva** (National University of Singapore), "Detection, Tracking and Recognition of Human Faces in Smart Environments".
- **Dr Victoria Mabin**, "Goldratt's Critical Chain, The Alternative to Critical Path".
- **Günter Last** (Universitat Karlsruhe), "On curvature measures of general closed sets and their application in stochastic geometry".
- **Maree Hunt**, "Learning by association and control by consequences".
- **Dr Paul S F Yip** (The University of Hong Kong), "Estimating Population Size in Proportional Trapping-Removal Models".
- **Kimmo Raatikainen** (University of Helsinki), "Middleware for Mobile Computing".
- **Tony Dale** (University of Canterbury), "More Computer Disasters".
- **Petr Hlineny**, "Using Computers in Mathematical Research".
- **Jeremy Ginsberg**, "The Digital Michelangelo Project: 3D Scanning of Large Statues".
- **Wu Guohua**, "Interactions between the c.e. degrees and the d.c.e. degrees".

- **Associate Professor Henry B Wolfe** (Department of Information Science, University of Otago), "An Introduction to Computer Forensics: Gathering Evidence in a Computing Environment".
- **Dr Vladan Devedzic**, "What Does Current Web-based Education Lack?"
- **Jose M Turull Torres**, "Relational databases and homogeneity in logics with counting".
- **Richard Dearden**, "AI on Mars: Autonomy for Planetary Rovers".
- **Associate Professor Serge Demidenko** (Massey University, Palmerston North), "Essentials and challenges of electronic testing".

Mark McGuinness

Continued

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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

Continued

CENTREFOLD

Vernon Squire

Vernon Squire arrived in New Zealand in October 1987, when he took up the Chair of Applied Mathematics at the University of Otago. Since his arrival, he has played a significant role in promoting applied mathematics at Otago and throughout New Zealand.

Vernon studied for his BSc (Hons) degree in applied mathematics at the University College of Wales, Aberwystwyth, the location chosen primarily to get as far away from suburban London where he grew up. He then completed Part III of the Cambridge Mathematical Tripos-a one-year course now known as the

Certificate of Advanced Study in Mathematics-in the Department of Applied Mathematics and Theoretical Physics. After this course Vernon chose to pursue his PhD at the Scott Polar Research Institute (SPRI), opting to do this on a whim in George Batchelor's office when the Director of SPRI rang up looking for a potential PhD student who didnÕt mind the idea of working in the polar regions. The famous research institute SPRI is part of the University of Cambridge and only teaches at graduate level. At the time, prior of the collapse of the Soviet Union, one of the battlegrounds in a possible confrontation between the superpowers was the Arctic Ocean. For this reason there was considerable research interest in all aspects of sea-ice, and in polar oceanography and meteorology. Vernon's PhD was about the interaction of ocean waves and sea-ice, modelled as a thermorheologically simple material, and this and the work that developed from it has remained one of his primary research interests ever since.

Vernon's PhD research marks the point at which advanced mathematics was first applied to modelling the interaction of ocean waves and sea-ice. One of the significant features that Vernon introduced was the effect of flexure, especially the flexure of ice floes (smallish pieces of sea-ice). At SPRI most students were encouraged to take part in experimental programmes in the belief that hands-on experience should guide the development of models. Vernon became active in the experimental program during his PhD, working in northern Canada and from a Royal Navy submarine in the Greenland Sea, and he was to continue this blend of theoretical and experimental work for many years.

After completing his PhD in 1978, Vernon stayed on at SPRI as a research associate and later acquired a University of Cambridge established position. Although there were no undergraduates housed in the Institute, he was involved in service teaching undergraduates, teaching MPhil students, and supervising PhD students. He also continued his experimental and theoretical research program, travelling to the Arctic and Antarctic over extended periods. Using strain gauges deployed on ice floes, he showed experimentally that the inelastic flexure of ice floes was a significant factor in their response to waves and, accordingly, had to be included in all models. He also contributed to detailed measurements of ocean wave propagation and attenuation through a field of sea-ice floes in the Bering Sea, using a helicopter to hop from floe to floe. These measurements, published over 15 years ago in Nature, still remain the most detailed study of this phenomenon.

Vernon also worked on icebergs and, with his research student Monica Kristensen, made measurements from the top of several Antarctic tabular bergs in the context of the way they break up. At the time money was available to support such research, as icebergs were believed to be a potential fresh water source for countries with warmer climates if only they could be transported. The paper that eventuated from this work, also published in Nature, had the unfortunate effect of closing off the supply of money, as it reached the obvious conclusion that bergs were unlikely to survive the passage north.

Vernon's work on moving loads on ice began in 1983 when he collected some data on a frozen lake in Norway, helped by a visitor to SPRI from New Zealand, Dr Bill Robinson. The data were compelling and inspired Vernon to find a theoretical model to explain them. Subsequently, in 1985, Bill invited Vernon and Pat Langhorne to New Zealand to do some more experiments, this time on the sea ice near Scott Base. The team even managed to persuade the US military to fly over their strain gauges so that the waves induced by low flying aircraft could be measured. The grin on Pat's face as she controlled the incoming C130 Hercules with instructions like `left a wee bit, up a wee bit' will never be forgotten by those present. A cover photo of a Hercules accompanied the subsequent article, which appeared in the journal Nature, and a research monograph has also been written on the subject area with Vernon as lead author.

While at SPRI, Vernon met his wife Pat Langhorne, who was originally involved in sea-ice research but who had subsequently become a research fellow at Newnham College working on afterburners in jet engines. But, some time around 1986 Vernon and Pat decided to leave Cambridge and move to Dunedin, New Zealand. After the 1985 trip Vernon was thinking seriously about working in New Zealand, and a small announcement in the Cambridge Reporter of a vacant position at Otago changed their lives. At this time, the Mathematics and Statistics Department at Otago was largely focused on teaching. From his arrival Vernon was active in promoting a research culture and this was even apparent to me as an undergraduate in his classes. Vernon emphasised the importance of research funding and attracting research students. He was also wise enough to negotiate two postdocs as a condition of his appointment. One of these postdocs was Colin Fox, who has subsequently become an active sea-ice researcher in his own right, amongst his many other talents. The other was Ross Vennell, who now has a position in the Marine Science Department at Otago.

Since arriving in New Zealand, Vernon has not pursued experimental research as actively, especially since the birth of his two sons Jonathan and Dougal. However, he has continued his theoretical work. Subsequent to his arrival, he made the first accurate numerical solutions of wave-ice floe interaction problems. This was accomplished with Colin Fox for a semi-infinite ice sheet and with myself for finite ice. Vernon and I were then able to extend these models from two to three dimensions. Most recently Vernon has been working with Tony Dixon and they have applied coherent potential scattering theory to wave scattering by ice floes and other materials with random inclusions. Vernon has also continued to study moving loads on ice, the

book mentioned above having been completed while at Otago. He has also been Head of Department since 1996.

As I have mentioned, a focus of Vernon's research has been to incorporate the effect of flexure in ice floe models properly. Recently there has been a huge research interest in flexible floating bodies because of the construction of floating runways and vast supertankers. This has meant that many of the research topics that Vernon has worked in have suddenly become popular. There are now many papers in which his research is discussed and extended, which are published in ocean engineering journals without even mentioning sea-ice. It must give Vernon some satisfaction to be able to look back on the growth of this research area that he was largely responsible for founding.

Mike Meylan
Massey University

Centrefolds Index

FEATURES

New Zealand Institute of Mathematics and its Applications (NZIMA)

The NZ Institute of Mathematics and its Applications (NZIMA) has been established as one of the seven Centres of Research Excellence selected by the NZ government in 2002. The NZIMA is hosted at the University of Auckland and headed by Fields Medallist Vaughan Jones DCNZM FRS FRSNZ (based at Berkeley) and Prof. Marston Conder FRSNZ (Auckland), with involvement of many of the best pure and applied mathematicians and statisticians from across the country.

Principal aims of the NZIMA are to:

a. create and sustain a critical mass of researchers in concentrations of excellence in mathematics and statistics and their applications,
b. provide NZ with a source of high-level quantitative expertise across a range of areas,
c. act as a facilitator of access to new developments internationally in the mathematical sciences, and
d. raise the level of knowledge and skills in the mathematical sciences in NZ.

The NZIMA will build on the activities of the NZ Mathematics Research Institute Inc. (NZMRI), which was set up some years ago with similar aims and since 1994 has organised annual summer meetings to which world experts have been invited to engage in research with NZ mathematicians and statisticians and to give short courses of lectures accessible to graduate students.

The extension of the NZMRI to the NZIMA is being modelled on similar mathematical research institutes in other countries, notably the Fields Institute (Canada), MSRI (Berkeley), and the Newton Institute (UK). In particular, it will place considerable emphasis on world-class research in fundamental areas of the mathematical sciences and the use of high-level mathematical techniques in modern application areas.

Key activities of the NZIMA will include

- the organisation of 6-monthly programmes on themes drawn from a range of fields of interest
- associated workshops held at various locations around NZ
- establishment of postdoctoral fellowships in the theme areas
- establishment of PhD and Masters scholarships in the theme areas
- establishment of a small number of scholarships for open competition to research students (from NZ or worldwide) in unrestricted areas of the mathematical sciences, on a merit basis
- establishment of annual *Maclaurin Fellowships**, to enable mathematical scientists from NZ or worldwide to take time out from their usual occupations and undertake full-time research in New Zealand (or partly overseas if based in New Zealand).

(* Richard Cockburn Maclaurin was a graduate of Auckland University College who went on to study at Cambridge, where he won the Smith Prize in Mathematics and Yorke Prize in Law, and was appointed as Foundation Professor of Mathematics at Victoria University College in 1899, and later Dean of Law and Professor of Astronomy. In 1908 he was invited to become President of the Massachusetts Institute of Technology (MIT), and helped transform that institution into the world-class research-based technological university it is today.)

Decisions on initial NZIMA programmes, fellowships, scholarships and a number of small grants were made (with the help of an International Scientific Advisory Board) in October, as follows:

- The first Maclaurin Fellows will be Prof. Rod Downey (Victoria University of Wellington) for all of 2003, and Prof. Richard Laugesen (University of Illinois at Urbana), who will be visiting NZ for the

first half of 2003./li>

- The first two fully-supported thematic programmes in 2003/04 will be one in *Logic and computation*, led by Prof. Rob Goldblatt (Victoria University of Wellington), and one in *Modelling cellular function*, led by Dr Nicolas Smith (University of Auckland).
- Partial funding has been offered to two programmes in 2003 that have support from other sources: one in *Numerical methods for evolutionary problems*, led by Prof. John Butcher (University of Auckland), and one in *Phylogenetic genomics*, led by Prof. Mike Steel(University of Canterbury).
- NZIMA scholarships have been awarded to four students who are about to begin or who are in the early stages of their PhDs in the mathematical sciences: Jean Zhaojing Gong (University of Canterbury), Garry Nathan (University of Auckland), Tissa Senanayake (University of Waikato), and Krasimira Tsaneva-Atanasova (University of Auckland).
- Scholarship support is also being offered by the NZIMA for students involved in a mathematics-in-industry style programme in *Industrial Mathematics*, being organised by Prof. Robert McKibbin (Massey University).
- A special grant of $10000 has been made to the NZ Mathematical Olympiad Committee to assist with expenses in training and sending a New Zealand team to the 2003 International Mathematical Olympiad (IMO).
- Eight other small grants (of between $5000 and $10000) have been offered to help with the costs of several local conferences and workshops as well as research visitors, to
    1. Prof. Mike Atkinson (Otago), for conference on Permutation Patterns (February 2003)
    2. Assoc. Prof. Steve Haslett (Massey), for conference on Multilevel Modelling (December 2002)
    3. Dr Ross Ihaka (Auckland), for visit by John Chambers (Bell Labs)
    4. Dr Mike Meylan (Massey), for visit by David Evans (Bristol)
    5. Dr Arkadii Slinko (Auckland), for visit by Murat Sertel (Istanbul)
    6. Prof. Geoff Whittle (Victoria), for NZMRI summer meeting (January 2003)
    7. Dr Thomas Yee (Auckland), for visit by Trevor Hastie (Stanford)
    8. Dr Ilze Ziedins (Auckland), for visit by Kavita Ramanan (LucentTechnologies).

Call for proposals and applications

The NZIMA is now calling for a second round of proposals for programmes (for 2004 and 2005) and applications for Maclaurin fellowships, postgraduate scholarships and small grants (for 2003 and 2004). Application deadlines are as follows:

NZIMA postgraduate scholarships	31 January 2003
NZIMA small grants	31 January 2003
Preliminary proposals for NZIMA programmes	15 March 2003
Maclaurin fellowships	15 March 2003

Decisions on postgraduate scholarships and small grants are expected to be made by mid-March 2003, and preliminary decisions on programme proposals by mid-April 2003 (after which full proposals would be invited for submission by mid-May 2003), and final decisions on programmes and Maclaurin fellowships by early August 2003.

Contact details (including the expected format of proposals and applications and other such information) are available on the NZIMA's website http://www.nzima.auckland.ac.nz/. Further information can also be obtained from the NZIMA's Executive Administrator, Margaret Woolgrove, by email (m.woolgrove@auckland.ac.nz) or by telephone (09) 3737599 extn 82025.

Marston Conder

REPORT ON THE 2002 NEW ZEALAND MATHEMATICS COLLOQUIUM

The University of Auckland hosted the 2002 NEW ZEALAND MATHEMATICS COLLOQUIUM forum 2-6 December 2002. It started with a reception at O'Rorke Hall on Sunday 1 December 2002 and was attended by 105 mathematicians.

The program consists of three parallel sessions with the following six invited speakers starting each morning and afternoon session:

- Dr Mary R Myerscough (ANZIAM Speaker), University of Sydney, Australia. "Ants, bees and algorithms: the mathematics of social insects."
- Professor Cristian Calude, Department of Computer Science, University of Auckland. "What is Turing's Halting Problem?"
- Professor Gaven Martin (NZMS Speaker), Department of Mathematics, University of Auckland.

"Automorphisms of lattices and tilings of hyperbolic 3-space, solving the Hurwitz-Siegel problem in 3-dimensions"
- Professor Robert A Wilson, School of Mathematics and Statistics, The University of Birmingham, UK "The Taming of the Monster."
- Professor Neil Trudinger, Australian National University. "Analytic methods in affine geometry."
- Dr John Hannah, Canterbury University. "Maple labs for multivariable calculus and differential equations."

The ANZIAM Annual General meeting was held on Monday afternoon followed by the NZMS Annual General Meeting.

On a warm Tuesday afternoon Bruce Calvert and twenty people went to Rangitoto Island for the official excursion of the colloquium.

Ninety four people attended the colloquium dinner at Duders in Devonport. At the dinner the NZMS Research award was awarded to Associate Professor Bakh Khoussainov of Computer Science at The University of Auckland and Professor Jeffrey Hunter of Massey University was awarded a Fellowship of the NZMS. The winner of the Aitken Prize for the best student presentation was Sivajah Somasundaram of the University of Waikato, Hamilton while the following student talks were highly recommended: Jonathan Marshall of Massey University, Krasimira Tsaneva-Atanasova of The University of Auckland and Pricilla Tse of The University of Auckland.

Thursday was a special Mathematics Education and Dynamical Systems day. We hope that this will continue in the future.

We want to thank the organizing committee consisting of David Gauld, Bruce Calvert, Nicoleen Cloete, Allison Heard, Arkadii Slinko and Roy Swenson for a successful colloquium and working hard behind the scenes.

A special thanks goes to Elizabeth Petrie for being the contact person and doing all the extra work.

Nicoleen Cloete

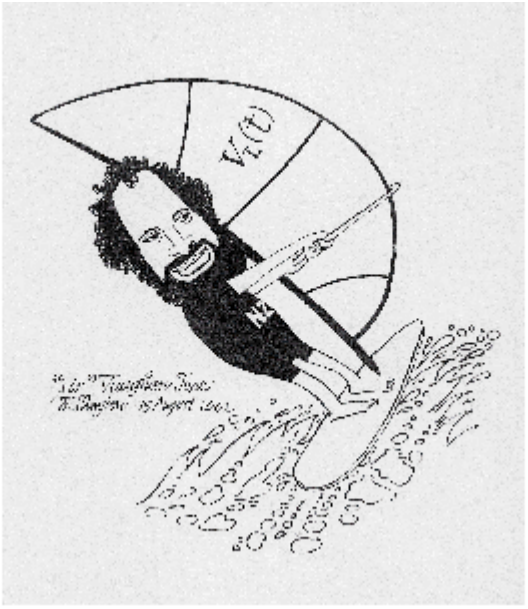
VICTORIA UNIVERSITY OF WELLINGTON MATHEMATICIANS CELEBRATE VAUGHAN JONES' "KNIGHTHOOD"

Vaughan Jones was invested as a Distinguished Companion of the New Zealand Order of Merit at a ceremony at Government House on 15 August 2002. This award is part of the revised Honours system that was introduced in 2000, and corresponds to a Knighthood under the previous system.

The evening before the investiture a reception in honour of Vaughan was held at the Victoria University of Wellington, organised by the VUW School of Mathematical and Computing Sciences and the NZ Institute of Mathematics and its Applications (NZIMA). Professor Rob Goldblatt congratulated Vaughan on behalf of those gathered, and expressed appreciation for the inspirational leadership and energy that he had contributed to mathematics research in New Zealand, referring in particular to the series of NZMRI Summer Workshops conducted over the last decade or so, and now the establishment of a Centre of Research Excellence in mathematics (the NZIMA), co-directed by Vaughan and Marston Conder. Rob then presented Vaughan with a framed drawing by the well-known cartoonist Bob Brockie, depicting Vaughan indulging in his favourite past-time.

More photographs of the function can be viewed at

http://www.mcs.vuw.ac.nz/~markm/VJonesReception/



LONDON MATHEMATICAL SOCIETY
Citation for Vaughan Jones

Vaughan Jones is elected to Honorary Membership of the Society in recognition of his profound achievements in the theory of von Neumann algebras and its applications. His work has had extensive ramifications throughout von Neumann algebra theory and also across a wide spectrum of fields in mathematics and physics.

Some aspect of Jones' work will be known to almost any mathematician or theoretical physicist. In a ground-breaking paper in 1983, he investigated the relative dimensions of subfactors (simple subalgebras of simple von Neumann algebras) and showed that they could only take certain values.

The study of subfactors has since expanded into an enormous and fruitful industry, but even in Jones's earliest work the essential technical innovations such as the `Jones tower' are all present. Even more remarkable than the growth of subfactor theory is the multitude of deep applications that this work has generated through his innovative ideas. These include knot theory (which was completely revitalised by the introduction of the Jones polynomial), quantum field theory and statistical mechanics.

The iterative construction of the Jones tower gives rise to a sequence of projections (the `Jones projections') and an associated nested sequence of algebras whose generators satisfy the same relations as those of the braid group. It is this that gives rise to the connection with the theory of knots and links. The traces on these algebras led Jones to discover a new polynomial invariant for knots, providing the key to the solution of long standing open problems. In subsequent work, similar constructions have led to an impressive array of new polynomial invariants for knots and links. It was soon realised that these same braid group relations also occur in the Yang-Baxter equations that arise in physics, and that the Jones projections are those of the

Temperley-Lieb algebra in statistical mechanics. This has greatly enhanced the fruitful two-way exchange of ideas between these subjects, leading for example to the classification of modular invariant partition functions in rational conformal field theory.

Vaughan Jones was the Society's Hardy Lecturer in 1989. He was elected a Fellow of the Royal Society in 1990, the year in which he was also awarded a Fields Medal. He received an honorary degree from the University of Wales in its centenary congregation in 1993. Among many other honours, he has received the freedom of the City of Auckland, and he was the first recipient of the Royal Society of New Zealand's highest award, the Rutherford Medal, for his contributions to knot theory.

rutherford centenary stamps

John Clark told (Newsletter 85, p.25) of a Russian stamp honouring Earnest Rutherford in 1971, on the centenary of his birth. In 1970 the RSNZ, in fulfillment of its statutory duty of advising the Government on matters scientific, recommended to the Postmaster General that a postage stamp be issued in 1971, to celebrate the centenary of the birth of Earnest Rutherford. "Earnest WHO??" was the response of The Honorable Lancelot Adams-Schneider. A committee of the RSNZ explained to him who Rutherford was, and why the centenary of Rutherford's birth deserved to be celebrated. In response, The Honorable Lancelot Adams-Schneider soundly berated the RSNZ for wasting his time by sending such a frivolous suggestion. In any case, they were too late: the preparation of a postage stamp required two years, not one! And he was then very busy with finalizing the arrangements for the commemorative stamps to be issued in 1971. Those stamps celebrated the centenary of the Federation of Countrywomen's Institutes of New Zealand, the centenary of the incorporation of the city of Invercargill, the centenary of the incorporation of the city of Masterton, the 50th anniversary of Rotary New Zealand, and - the 50th birthday of the horse Phar Lap! Late in 1971, the RSNZ committee politely forwarded to the Postmaster General the wrapping paper of a parcel of books, which had been posted to the RSNZ by the USSR Academy of Sciences. The stamps on that wrapping included two different Soviet stamps, celebrating the centenary of the birth of Rutherford. Upon reflection, The Honorable Lancelot Adams-Schneider waived the two-year rule for preparing a postage stamp; and in December 1971 the NZ Post Office issued stamps for 1 cent and for 7 cents, both reproducing the official portrait of Rutherford as President of the Royal Society of London.

Garry J. Tee

VIENNA 1938 AND THE EXODUS OF MATHEMATICIANS

Garry J. Tee
Department of Mathematics, University of Auckland

From 1920 to 1938 Vienna was a major centre of mathematics, with many eminent mathematicians who were either Austrian by birth, or had moved to Vienna from other countries. Most of them were Jews. The most renowned included Ludwig Wittgenstein, Kurt G\"{o}del, Karl Menger, Hans Hahn, Olga Hahn, Wilhelm Wirtinger, Philipp FŸrtwangler, Kurt Reidemeister, Felix Pollaczek, Richard von Mises and his wife Hilda Geiringer, Karl Popper, Franz Alt, Rudolph Carnap, Friedrich Waismann, Abraham Wald, Olga Taussky-Todd, Eduard Helly and his wife Elise Bloch, and Stefan Vajda. From 1930 to 1937, several mathematicians emigrated from Austria. In particular, Karl Popper observed the rise of Hitler, and so in 1937 he became a Lecturer in Philosophy at Canterbury University College.

Germany annexed Austria in 1938, and those Jewish mathematicians who stayed in Vienna were murdered by the Nazis. Most of the mathematicians managed to escape from Austria, thereby greatly enriching the rest of the world.

A remarkable exhibition about those refugee mathematicians was displayed at the University of Vienna from 2001 September 17 to October 20. The exhibition was organized by Dr Karl Sigmund, Director of the Mathematics Institute at the University of Vienna. The catalogue [Sigmund 2001] gives grim accounts and photographs of the Nazi onslaught on mathematicians in Austria. There are sections devoted to each of the major mathematicians, with briefer accounts of numerous other mathematicians and of many young refugees who became mathematicians.

In particular, there is an entry about Hans Offenberger (1920-1999), who survived Dachau concentration camp and then settled in New Zealand. Hans studied mathematics under Professor Forder at Auckland University College, and then at Canterbury University College he studied under Karl Popper, who became a lifelong friend. Hans became Head of Mathematics at Wellington Polytechnic, and he was the President of the New Zealand Association of Scientists from 1974 to 1976. He contributed a chapter on Mathematics in the Technical Institutes of New Zealand to the Festschrift for Professor Henry George Forder [Butcher 1971], and he organised the special Popper issue of New Zealand Science Review (Vol. 48, 1991, 3-4).

Several other mathematicians discussed in this catalogue have visited New Zealand, including Hermann Bondi and Hans Schneider. Walter Rudin has spent some periods working with colleagues at the University

of Auckland. Karl Menger became a friend of Professor Henry George Forder at Auckland, and he contributed a chapter on The New Foundation of Hyperbolic Geometry to the Forder Festschrift volume [Butcher 1991].

The organizing of this exhibition at the University of Vienna might be considered a courageous act, in the current political climate in Austria.

References

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AUCKLAND-NOVOSIBIRSK

Vladimir Golubyatnikov visited the University of Auckland Department of Mathematics for the First Semester of 2002, on leave from the Institute of Mathematics of the Russian Academy of Sciences, at Novosibirsk. He works in geometry, topology and mechanics - and he also publishes poetry. He commenced writing the following poem in Auckland, and finished writing it at Novosibirsk. It was translated from Russian by Garry Tee, then checked and corrected by the author.

ALTER TU

Владимир Голубятников
Леночке

На другом краю планеты,
Где весь год цветут цветы,
Но не пишутся сонеты,
Обитает Антиты.
Вы — два полюса Вселенной,
Всем Вы вертите вдвоём,
Только нет души нетленной
В отражении твоём.

Манит в бурную пучину
Блеск её бездонных глаз,
Обещая — не по чину —
Всё, включая бизнес-класс,
Нежность вод геотермальных,
Тонкорунные стада ...
Где найдёшь вполне нормальных,
Чтоб не бросились туда!

Величавые вулканы
Салютуют небесам,
Скачут птицы-великаны,
По реликтовым лесам,
В берег бьёт волна прилива
Небывалой высоты,
Ждёт меня нетерпеливо
Людоедка Антиты.

Окленд–Новосибирск,
Май–Сентябрь 2002.

ALTER TU

by Vladimir Golubyatnikov
to Lenochka

On the far side of the planet,
Where flowers bloom all year,
But I could not write sonnets,
There dwells your Antithesis.
You — twin poles of the World,
Both of you turn together,
Only there is no imperishable soul
In the reflection of Thee.

In stormy deeps there beckons
The sparkling of her bottomless eyes,
Promising — and not just for status —
Everything, including Business Class,
Sweetness of geothermal waters,
Fine-wooled flocks ...
What sane person would not succumb
To the temptation to rush there?

Great volcanos
Salute the sky,
Giant moa birds run
Past prehistoric tree-ferns,
On the coast, tidal waves surge
To unprecedented height,
Eagerly, there comes to me
Your cannibal Antithesis.

Auckland–Novosibirsk,
May–September 2002.
Translation by Garry Tee, 2002-11-11.

Gary Tee

How to Get On

There is an amusing essay at http://in-cites.com/scientists/DrDavidDonoho.html on "How to be a Highly Cited Author in the Mathematical Sciences," by David Donoho, one of the five most cited authors in maths. You may scoff, but citations are already in use in promotion applications, and with the advent of

performance-based research funding, worse may be on the way. Be prepared. Donoho finds four correlative factors: (i) Work in statistics; (ii) work in wavelets; (iii) work in Sequoia Hall, Stanford; and (iv) work with a highly cited co-author. More seriously, he finds four causal factors: (i) Develop a method which can be applied on statistical data of a kind whose prevalence is growing rapidly; (ii) implement the method in software, place examples of the software's use in the paper, make the software of broad functionality, and give the software away for free; (iii) in developing a methodology, develop synthetic test cases which you distribute freely over the Internet; and (iv) in developing a methodology, leave room for improvement. However, he notes with caution, "It also seems that the low-citation papers were some of my "hardest" papers-both hard for me to obtain the results and hard to read. They also include some of my favorite papers, papers which convinced me I was really doing something that would leave a mark. It is truly dispiriting to see that the papers one thought, in youthful innocence, might leave a mark actually got what seems like few citations! Nevertheless, for one's own self-respect, it is important to do work that seems hard and deep. Also, and this is very important, the basis for several of the highly cited papers in my list of 10 was actually laid out in certain other papers which were hard, deep, and got very few citations."

Robert McLachlan

NEW COLLEAGUES

Dr Mik Black
The University of Auckland

Dr Anthony Blaom
The University of Auckland

Dr Carlo Laing
Massey University

Dr Mik Black

Dr Mik Black joined the Department of Statistics at The University of Auckland in September as a Lecturer. Mik is returning to New Zealand after spending five years at Purdue University in the United States pursuing his Ph.D. under the supervision of Rebecca Doerge. His dissertation is titled "Statistical issues in the design and analysis of spotted microarray experiments", and his research interests include bioinformatics, statistical genetics/genomics, and Bayesian statistics. Before traveling to the United States, Mik studied at the University of Canterbury, receiving a B.Sc.(Hons) in 1996. Currently he is investigating the performance of false discovery rate controlling procedures in the context of microarray experimentation.

Garry J. Tee

Dr Anthony Blaom

Dr Anthony Blaom joined The University of Auckland Department of Mathematics in August. The son of the late Tony Perry, the University of Melbourne experimentalist in turbulence, Anthony began his training in mechanical Engineering (BE, University of Melbourne) and aeronautics (MSc, Caltech). Research on theoretical and computational aspects of vortex flows sparked a keen interest in dynamical systems, leading ultimately to graduate research on the perturbation theory of Hamiltonian dynamical systems (PhD, Mathematics, Caltech). While maintaining an interest in dynamical systems, especially geometric/symmetry aspects, Anthony's current work is chiefly in differential geometry, especially symplectic geometry, almost-Hermitian geometry, Cartan geometries, and Lie theory. He has longer-term interests in applications to manifold topology. In the three-year period preceding his new appointment in New Zealand, Anthony was a full-time at-home parent for his daughters, now aged 20 months and 3 years, while his wife worked as a pilot for US Airways. In the family's last year in the United States, Anthony was also a Visiting Research Collaborator at Princeton University.

Garry J. Tee

Dr Carlo Laing

Dr Carlo Laing has recently been appointed as a lecturer in the Institute of Information and Mathematical Sciences at Massey University. His research interests include non-linear dynamics, mathematical modelling and computational neuroscience (understanding how real nervous systems actually do the things they do). He is no stranger to Auckland, having grown up in Howick and done both a BSc and MSc (physics) at Auckland University. He has a PhD in applied maths from Cambridge University and has done postdocs at Cambridge/University College London, Surrey, Pittsburgh and most recently Ottawa.

Mike Meylan

Dr Rosalind Archer
The University of Auckland

Dr Charles Unsworth
The University of Auckland

Dr Rosalind Archer

Rosalind Archer earned a BE in Engineering Science here in 1993 and then undertook graduate study in Petroleum Engineering. She gained MS and PhD degrees from Stanford University where she addressed the numerical simulation of fluid flow in oil reservoirs. On graduation she worked for two years as an Assistant Professor of Petroleum Engineering at Texas A & M University. Her current interests include applications of the boundary element method to reservoir engineering problems and modeling of flow in fractured/faulted reservoirs.

Don Nield

Dr Charles Unsworth

The second new lecturer is Charles Unsworth, who attained his BSc Hons in Mathematical Physics at the University of Liverpool in 1991 and an MSc in Astronomical Technology at Edinburgh University in 1992. He then obtained his PhD in Millimeter-Wave Physics at St Andrew's University, specializing in instrument development, in 1996. He then went on to work for the Ministry of Defence in the UK in radar hardware development. In 1998 he joined the University of Edinburgh as a Research Fellow in the Department of Electrical Engineering. There he worked in the area of radar signal processing, with emphasis on nonlinear dynamics, surrogate data analysis and hidden Markov models. For the last two years he has been applying signal processing techniques such as independent component analysis to the biological signals of the EEG in order to model epilepsy. He plans to continue his research in biological signal modeling and biological instrumentation development. His appointment is a joint one with our Department of Electrical and Electronic Engineering.

Don Nield

Right now we can hear the traffic outside, the noise of the generator, the aeroplanes above - this proliferation just makes rigorous thought that much more impossible. It is impossible to imagine Wittgenstein thinking out a problem in front of an audience today. Impossible... Everything is becoming generalized. I am the only person in the University not to have a computer, and that is regarded as quixotic. It is the only sort of eccentricity that is left. But when I first came here, almost every other colleague was slightly eccentric. That was the whole point - people were different, so they could tell you things from their different standpoints. They have all been eliminated. (W. G. Sebald, writer and German lecturer at the University of East Anglia, in interview with amazon.co.uk)

BOOK REVIEWS

SPRINGER-VERLAG PUBLICATIONS

Information has been received about the following publications. Anyone interested in reviewing any of these books should contact

David Alcorn
Department of Mathematics
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Fundamentals of Queueing Networks: Performance, Asymptotics, and Optimization
by Hong Chen and David D. Yao, Applications of Mathematics Stochastic Modelling and Applied Probability, 46,
Springer-Verlag, New York, 2001, 405pp, DM 160.39. ISBN 0-387-95166-0.

Written by two leading researchers in the field of applied probability, this text covers a breadth of material on queueing networks. It provides in textbook form many recent results previously found only in research papers while at the same time leading students through a variety of models and concepts necessary to get a grasp of these results. This is however not a book for the novice. It requires a good background of basic stochastic processes (especially Markov chains in continuous time and Brownian models) as well an exposure to measure theoretic probability (including almost sure convergence, weak convergence, and strong laws) coupled with considerable mathematical maturity.

The text effectively consists of three parts. The first part (Chapters 1-4), requiring a more modest background, covers the classical birth-death queues, time reversibility, stochastic ordering, open and closed Jackson networks, stochastic comparisons, Kelly networks and quasi-reversible queues. Most of this part is very much along the lines of Frank Kelly's well-known book on "Reversibility and stochastic networks" (Wiley, 1979). The second part (Chapters 5-10) builds on the advanced probability background with a chapter on "technical desiderata" including Brownian motion, functional theorems - strong law, central limit theorem, law of the iterated logarithm, strong approximation, and rates of convergence. With this arsenal a variety of limit theorems, including fluid and diffusion approximations, for queue length and workload processes in the G/G/1 queue follow (Chapter 6). Generalised Jackson networks are studied (in Chapter 7) with fluid and diffusion approximations being based upon "oblique reflection mapping" and "reflected Brownian motion". A two-station multiclass network (due to Kumar and Seidman), multi-class feedforward networks and Brownian approximations round out the second part. The final part consists of two chapters on specialised topics - conservation laws and scheduling of fluid networks.

For teaching purposes the instructor can focus on either the first two parts, supplemented by one or both chapters of the third part.

I like the book. It is well written in a clear lucid style with key references provided at the end of each chapter. It is however clearly a text for an advanced course on queueing networks. For researchers in the field it provides a useful compendium of results and techniques - a superb resource book that should be in the library of such applied probabilists.

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Such Silver Currents - The Story of William and Lucy Clifford, 1845-1929
by M. Chisholm, The Lutterworth Press, Cambridge, 2002.
10+198 pages, £17.50, ISBN 0-7188-3017-2

The death of William Kingdon Clifford F.R.S. at the age of 33, at Madeira on 1879 March 3, was one of the great tragedies of mathematics. He had a brilliant reputation for his mathematical research, and for his lectures and essays on science, philosophy and ethics. Clifford Algebras and Clifford Parallels are now topics of flourishing research in mathematics and in physics.

Monty Chisholm has now produced the first biography of William Clifford (1845-1879) and of his remarkable wife Lucy (1846-1929). The widow of a grandson of William and Lucy permitted the author of this book to use the papers of Lucy. However, the major collection of William's papers is held by a descendant, and it is much to be regretted that the author was not able to use that collection.

Sir Michael Atiyah P.R.S. has contributed a *Foreword*, and Sir Roger Penrose has contributed an *Afterword*. The author's husband Roy Chisholm is a researcher in Clifford Algebras, and the chapter on *The Clifford Heritage* was written jointly by Monty and Roy Chisholm. Their son Dave Chisholm contributed a cartoon depicting William as a student athlete at Cambridge.

William was born on 1845 May 4 at Exeter, where his father was a bookseller. At the age of 15 William won a Mathematical and Classical scholarship to Kings College London, where he studied from 1860 to 1863 and wrote his first mathematical paper. In 1863 he became a student at Trinity College of Cambridge University, and he was a Fellow of Trinity College from 1868 to 1871. From his arrival at Cambridge he attracted attention by his extraordinary mathematical powers, and he gained wider fame as an athlete. He arrived at Cambridge as a High Church Anglican sympathetic to Roman Catholicism, but the intense debates about Darwin and evolution made him a fervent atheist. The Professor of Poetry at Oxford University had expelled Shelley in 1811 for atheism, and William became a friend of some older men who had served long prison terms for atheism. Some people furiously denounced William (in NZ as well as in England), but he did not suffer any legal or professional penalties.

In 1871, William became Professor of Applied Mathematics and Mechanics at University College London. He was an inspiring lecturer, and he was the first mathematician in the U.K. to admit women to his lectures.

He was a friend of many eminent scientists, including Clerk Maxwell, Cayley, Sylvester, Huxley and Tyndall; and he became a close friend of the novelist George Eliot and her partner George Lewes. He was intensely interested in non-Euclidean geometry, and in a lecture to the Cambridge Philosophical Society in 1870 he suggested that matter and energy consist of regions of curved space. In 1873 his translation of Riemann's epoch-making lecture `On the hypotheses which lie at the bases of geometry' was published in volume 3 of *Nature*. William delighted in the company of children, and he published some witty nonsense for their amusement.

Sophia Lucy Jane Lane was born on 1846 August 2 at Great College Street in Camden Town, London. Her paternal grandfather had owned slave plantations in Barbados, and in 1871 she was living with her maternal grandfather Thomas Gaspey, a prominent historical writer. But Lucy, to the end of her life, evaded questions about her early life, and she encouraged people to think that she had been born in Barbados, rather than in London. From 1871 she was a journalist and novelist. When she and her brother John Lane both worked for the *Standard* newspaper, "Lucy never spoke to him or acknowledged him as her brother" (p.81). Even before Lucy met William, her age had begun increasing more slowly than the years of her life (as is not uncommon).

William and Lucy met in 1873, they became engaged in 1874, and she then wrote him a 20-page letter expressing doubts and fears about his atheism. But he persuaded her to abandon religion, and for the rest of her long life she remained a devoted follower of William's ideas. On 1875 April 7, "mathematics students turning up for their morning lecture at University College London were surprised to see a message chalked on the blackboard. It read, `I am obliged to be absent on important business which will probably not occur again'. " (p.1). William and Lucy married that day, and in the 4 years of their marriage they had 2 daughters.

William worked with unremitting intensity at teaching, research and lecturing, even though he shewed distinct and grave symptoms of lung disease by 1876. His friends were alarmed by his refusal to abate his phenomenal rate of work, despite his deteriorating health. His closest friend Frederick Pollock wrote that "He could not be induced, or only with the utmost difficulty, to pay even moderate attention to the cautions and observances which are commonly and aptly described as `taking care of one's self' " (p.50). In 1878 William suffered general physical collapse, and Huxley, Sylvester, Clerk Maxwell and other friends arranged for William and Lucy to make an extensive tour of Italy (via Malta) followed by a period in a Swiss sanatorium. But William returned to England completely broken in health.

In a desperate attempt to recover in a warm climate, William and Lucy sailed to Madeira in January 1879, accompanied by the artist John Collier. At Funchal the historian William Cory, who had written the *Eton Boating Song*, met William and was profoundly impressed by that dying man. William calmly dictated detailed instructions about the publication of his academic works, and he remained cheerful, clear-minded and interested in the daily news until he died, on 1879 March 3.

William's body was taken to England by a Royal Navy gunboat returning from the war against the Zulus. He was buried in Highgate Cemetery, and in 1883 Karl Marx was buried close to William's grave.

Leslie Stephen and Frederick Pollock edited Clifford's **Lectures and Essays** (2 volumes, Macmillan, London, 1879 and later editions), with a lengthy biographical and bibliographical Introduction by Pollock. R. Tucker edited Clifford's **Mathematical Papers** (1882 & 1968), with a 36-page biographical introduction by H. J. S. Smith. Karl Pearson completed William's influential treatise **The Common Sense of the Exact Sciences**, which was first published in 1885.

Lucy was left a widow at the age of 32, with 2 infant daughters. William's friends organized a Fund to benefit Lucy and her daughters. She revered the memory of William, and she worked as a writer to support herself and daughters. She remained a close friend of Huxley, Tyndall, Sylvester and of George Eliot. She became a popular writer of novels and plays, mostly dealing with strong-minded women creating their own way of life in Victorian England. Money was always a problem, and she lived in London on the west side of Hyde Park - "the unfashionable side". Nonetheless, her literary salon became a significant feature of English literary society. Her many literary friends ranged in period from Robert Browning to Noel Coward. The novelist Hugh Walpole, who was born at Auckland on 1884 May 13, became a close friend. Her closest friends included the American writers Oliver Wendell Holmes Jr, James Russell Lowell, William James and especially his brother Henry James.

But after 1908 Lucy experienced increasing difficulty in getting her works published and performed, since her favourite themes seemed increasingly old-fashioned. In 1928 she sent her latest play **A Woman Alone** to her friend George Bernard Shaw, who responded with frank comments: "I tell you you are the dupe of your own experience. Of course W.K.C. was cleverer than you. But he was cleverer than ME - cleverer even than Einstein. ... So don't argue; but write another play that will not have for its proper title **Back to the Eighteen-sixties!**" (p.82).

Fifty years after William was buried in Highgate Cemetery, Lucy was buried with him. Both William and

Lucy had written their own epitaph.

William Kingdon Clifford
Born May 4th, 1845
Died March 3rd, 1879

I was not, and was conceived:
I loved, and did a little work.
I am not, and grieve not.

And

Lucy, his wife
Died April 21st, 1929

Oh, two such silver currents when they join
Do glorify the banks that bound them in.

William had revered Charles Darwin, but never met him or corresponded with him. In 1879, Darwin generously contributed £50 to the Fund for Lucy and her daughters. (Letter from Charles Darwin to John Tyndall on 1879 February 17, in: Frederick Burkhardt & Sydney Smith (editors), **A Calendar of the Correspondence of Charles Darwin, 1821-1882**, Garland Publishing, New York, 1985, letter 11886.)

This book tells about William Clifford's continuing influence within the U.K. and U.S.A. - but he also had influence in New Zealand.

At University College London, William's friends included the eminent chemist Sir Edward Frankland, whose elder son Frederick William Frankland (1854-1916) attended William's lectures on mathematics in 1872 and 1873. But Frederick Frankland's health then collapsed, and he remained physically frail (but remarkably active) for the rest of his life. In 1875 Frankland ran away to New Zealand, where he joined the Government Insurance Office in Wellington. He became the New Zealand Government Actuary in 1878 and gained an international reputation for his actuarial work. On 1876 September 9 he went to the General Assembly Library, to re-read Clifford's translation of Riemann's lecture `On the hypotheses which lie at the bases of geometry'. On 1876 November 11 he delivered a lecture to the Wellington Philosophical Society, in which he developed a new non-Euclidean geometry which had been suggested by Clifford. That lecture was reported respectfully in *The Evening Post* the next day, with the reporter referring readers to the forthcoming publication of Frankland's lecture in *Transactions of the New Zealand Institute* for the details (`On the simplest continuous manifoldness of two dimensions and of finite extent', *TNZI* **9** (1876), 272-279). Frankland's paper created uproar in the intellectual world of New Zealand, with three of the most mathematically knowledgeable members of the New Zealand Institute publishing papers protesting at the blasphemy of considering geometries which differed from Euclid's! Nonetheless, Frankland's paper was reprinted in *Proceedings of the London Mathematical Society*, and also in *Nature*.

In 1887, Robert Stout introduced a Bill to establish a Wellington college of the University of New Zealand, which was passed by the House of Representatives but rejected by the Legislative Council. The Hon. Henry Scotland did not approve of university colleges. He declared that "You get men out from England at £600 a year, and ignorant people think we are getting first-rate scholars. Nothing of the kind. We are getting third-rate men, their heads filled with Darwin and Huxley, Clifford and Tindall, who are only fit to instil infidel principles into the youth of the colony" (J. C. Beaglehole, **Victoria University College, an essay towards a history**, New Zealand University Press, Wellington, 1949, p.10).

When Oscar Wilde was a student at Oxford University (1874-1878) he had already adopted the pose of an idle aesthete, who never did any work. Behind that pose he studied and wrote with fierce intensity, in order to maintain that facade. In particular, he carefully studied Clifford's essays, which influenced some of Wilde's later paradoxes and witticisms (Regenia Gardner, *Wilde and the Victorians*, in Peter Raby (editor) **The Cambridge Companion to Oscar Wilde**, Cambridge University Press, 1997, Chapter 2, p.25).

Many readers of this book will be confused by the extremely irregular time-sequence. Very few of the many letters which are quoted are assigned any date. An interview with Lucy is stated (apparently correctly) to have been published in 1899 (p. 82); but in the *Notes* that interview is dated to 1989 (p.12), to 1999 (p.84) and to 1899 (p.154). Lucy is said to have attended a wedding with her friends Robert Browning and Henry James in 1903 (p.7); but Robert Browning died in 1889. A portrait of Lucy's paternal grandfather is described as a photograph (p.8): but he died in 1829, ten years before the first practical form of photography was developed by Daguerre. Viola Meynell's book **The Best of Friends, Further Letters to Sydney Carlyle Cockerell** (Rupert Hart-Davis, London, 1956) is misdated to 1856 (p.133).

A letter to William in 1874, congratulating him on his engagement to Lucy, is described as "George Eliot's letter" (p.1), but it was written by George Eliot's partner George Lewes. Bertrand Russell's grandmother

Lady Arthur Russell is described as his mother (p.118), and Sir John Herschel's ideas about atoms are attributed to his father Sir William Herschel (p.167). Huxley in 1881 is described as "Sir Thomas Huxley - President of the Royal Society" (p.123). But Huxley despised knighthood, and he became P.R.S. in 1883.

In 1914, Lucy and her daughter Ethel were amongst the 234 contributors to something called **King Albert's Book**, which is not explained (pages 127-128). I puzzled at length over who that King Albert was, until I inferred that he was probably the King of Belgium when it was invaded by Germany, in 1914.

There are some confusing misprints, including "C. S. Pierce" for "C. S. Peirce" (pages 2 & 197), "descendent" for "descendant" (p.13), "records" for "record" (p.13), "quoting" for "quoted" (p.27), "Froud's biography" for "Froude's biography" (p.115) and "women" for "woman" (p.146). The Bibliography lists the 1901 edition of William's **Lectures and Essays** as being published in New York, but that edition was also published by Macmillan in London. The list of editions of **The Common Sense of the Exact Sciences** omits the 3rd edition, published in 1892. The Index is inadequate.

This book is useful as an account of the great mathematician and his remarkable wife - but it could have been much better if it had been edited rigourously.

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Lengths, widths, surfaces. A Portrait of Old Babylonian Algebra and Its Kin
by Jens Høyrup, Springer-Verlag, New York, 2002, 459pp, EUR 99.95. ISBN 0-387-95303-5

> Any serious study must be based ... on the texts themselves, in order to get a proper estimate of the sometimes fluent boundaries between established facts and modern interpretation. [**Neu**, page 49]

This book is all about mind-reading - trying to decipher the thought processes that went into some of our oldest recorded mathematics. As someone who regularly tries to perform similar miracles on students' exam scripts, you may be sceptical about the author's chances of success, but the picture he builds up has a consistency which should convince you otherwise.

Old Babylonian algebra comes down to us in the form of hundreds of clay tablets which were excavated in the late 19th century in what is now southern Iraq. Unlike Greek mathematics, which we have courtesy of a long history of copying and editing of manuscripts, Old Babylonian algebra comes to us as primary sources - these tablets are the actual texts written by Babylonian scribes about 4000 years ago. This makes them perfect raw material if we are interested in the historical development of mathematical thought. By contrast, for example, the oldest surviving document containing the mathematics of Archimedes was written about 1000 years after Archimedes died. This leaves us with second hand accounts of Archimedes' work, so that we cannot always tell the difference between Archimedes' original ideas and later re-interpretations of them by (say) Eutocius in the sixth century AD.

Unfortunately, the Old Babylonian tablets are decidedly telegraphic in nature, and early interpretations of them tended to reconstruct their meaning by focusing more on the obvious operations being performed on the successive numbers found in the texts, and less on the connecting words. Here's an example translated according to such methods (see [**A**, page 23]).

> I have added the area and two thirds of the side of my square and it is 0;35. You take 1, the "coefficient". Two thirds of 1, the coefficient, is 0;40. Half of this, 0;20, you multiply by 0;20 (and the result) 0;6,40 you add to 0;35, and (the result) 0;41,40 has 0;50 as its square root. 0;20 which you multiplied by itself, you subtract from 0;50 and 0;30 is the (side of) the square.

Aaboe interprets this example as stating and solving what we would now call the quadratic equation

$$x^2 + \frac{2}{3}x = \frac{35}{60}$$

The numbers are represented in sexagesimal form so that, for example, 0;41,40 corresponds to

$$\frac{41}{60} + \frac{40}{60^2}$$

Aaboe explains that the somewhat mysterious first step of the solution process is converting $\frac{2}{3}$ to its

sexagesimal equivalent, and that the whole process amounts to what we would express as

$$x = \sqrt{\left(\frac{0;40}{2}\right)^2 + 0;35} - \frac{0;40}{2}$$

Notice that, in keeping with this algebraic interpretation, one word has been translated as the anachronistic "coefficient", hinting at a possible role in the algebraic explanation (it seems to be related to the coefficient of the linear term), but also perhaps admitting some mystification as to its meaning for the Old Babylonian scribe.

Aaboe goes on to say that this problem and others like it

> ... are anything but practical problems. That we are asked to add areas and lengths shows clearly that no real geometrical situation is envisaged. In fact, the term "square" has no more geometrical connotation than it does in our algebra. [**A**, page 25]

Similar sentiments are expressed by Neugebauer [**Neu**, page 42] and van der Waerden [**vdW**, page 72]: to quote the latter, *The thought processes of the Babylonians were chiefly algebraic*.

In 1990, Jens Høyrup [**H**] challenged this view of Old Babylonian mathematics, and proposed instead a geometric interpretation. Although Høyrup's interpretation has found its way into such standard texts as [**K**], it is often still explained in algebraic terms (see [**K**, pages 37-38] for example) and to that extent, at least, misrepresents the Old Babylonian scribes' modes of thought. As Høyrup's paper is hard to get in New Zealand, the present volume is thus the first chance for many of us to see Høyrup's attempt to get inside the mind of Old Babylonian scribes.

Høyrup discovered his new interpretation after a careful re-examination of the texts and the technical language in which they couched their solution schemes. His method consists of a two pronged attack. Firstly, what he calls *structural analysis* - tracking the use of an operation throughout the whole corpus, noting not only the situations where it is used, but also the situations where one might have expected it to be used but it wasn't. For example, this reveals two different addition operations, which Høyrup calls *appending* and *accumulating* to try to convey their differing natures - the first results in something being made bigger by the addition of another piece, the second gives something more akin to an accountant's total.

The second prong of Høyrup's attack is what he calls *close reading*. The idea here is that it is a reasonable first hypothesis to assume that every word of the text (especially such telegraphic text) is there for a good reason - it has a meaning, or at least some intended connotation. The word translated as "coefficient" in the above excerpt is a good example. One possible reading had been a word meaning "projection" but Høyrup was the first person to see the significance of this meaning. As he says (page 51), *In mathematical texts, its value is always* 1*, and it designates the breadth that transforms a `Euclidean line' into a `broad line'*. In Figure 1 below for example, this `broad line' is a fairly substantial rectangle projecting from the unknown square.

Since Høyrup wants to get inside the mind of the Old Babylonian scribe, his translation needs to be free (as far as possible) from any contamination by modern ideas. To achieve this, he constructs a new technical vocabulary, sometimes resorting to obscure words - like *moiety* for the natural half of something which results when it is split into two equal pieces - and sometimes even inventing new words - like *equalside* for the characteristic length associated with a square (which in older translations would have been rendered by the anachronistic *square root*). But in all cases he stays close to the root meanings of the words involved, so as to preserve any connotations they may have had for the Old Babylonian scribes.

Høyrup's new translations reveal an extensive use of geometrical terminology, which has an internal consistency that *could not [have remained] in consistent use once an original geometric mode of thought had been forgotten* (page 34).

As Aaboe remarked in the quote above, for many modern readers there is no geometrical connotation involved when they read x^2 as *x squared*. (If you don't believe this, ask some of your students or even some of your local high school teachers.) Høyrup's re-reading of the Old Babylonian texts is rather like discovering that, if we read x^2 and x^3 as *x squared* and *x cubed*, then we can see a previously hidden layer of geometric meaning which, for example, explains the binomial expansions of $(a+b)^2$ and $(a+b)^3$. However, in Høyrup's case it is not just two words *squared* and *cubed*, but rather the whole vocabulary of the solving process which is imbued with the geometric spirit.

So, what does Old Babylonian algebra look like now? Let's go back to the above excerpt from [**A**]. A translation using Hoyrup's vocabulary might run as follows:

> I have accumulated the surface and two thirds of the confrontation: 0;35. You posit 1, the projection. Two thirds of 1, the projection, is 0;40. You break the moiety of this. You make 0;20 and 0;20 hold each other. You append 0;6,40 to 0;35. 0;50 is the equalside of 0;41,40. 0;20 which you made hold itself, you tear out from from 0;50. 0;30 is the confrontation.

Such a translation lets the text speak for itself, but some explanation may still be needed. The *confrontation* should be thought of as one of the confronting sides which define a square. The confronting sides are multiplied to produce the *surface* or area of the square, and the confrontation itself is converted into an area by being thought of as a thick line. So the problem statement in the first sentence says that, in the left hand part of Figure 1, the shaded areas total to 0;35.

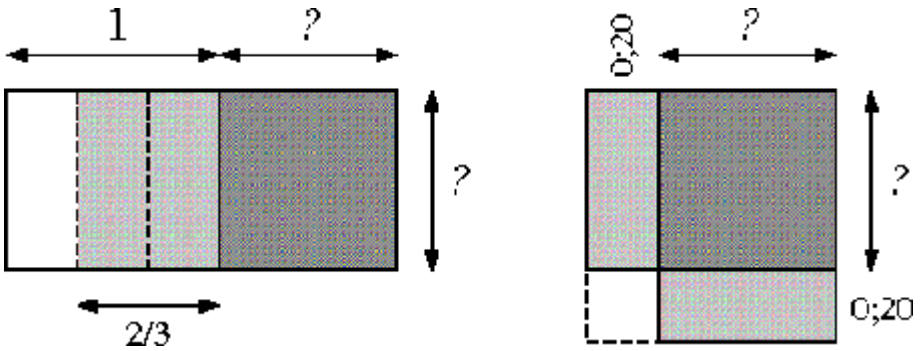

Figure 1: A geometric interpretation of the calculation.

The solving process begins by breaking the two thirds in half and moving one half so that the two halves hold a square (the unshaded square in the right hand part of Figure 1). The area of the unshaded square is calculated and added to the known shaded area, giving the area of the completed square. Once the side of this square is known, the known side of the unshaded square can be torn out, leaving the desired confrontation.

As you can see, there is no need for any algebraic symbolism here. Indeed, while the algebraic interpretation given earlier has an air of labyrinthine calculations with mysterious origins, in the geometric interpretation the entire solving process is transparent, as long as you follow the instructions using a diagram like Figure 1. (Such transparency has an obvious appeal even today, and [**Nel**] is a rich source of examples from algebra and analysis suitable for use in modern classrooms and using a similar approach.) It has to be said that such diagrams are not present in the texts which have come down to us, but there are several possible ways the scribes could have drawn them. Høyrup tentatively suggests that they may have been drawn in sand strewn on some flat surface.

There is an old tradition of seeing the Greeks as the first mathematicians, based on the idea that they were the first people to "give a central place to the formulation and proof of theorems" [**A**, page 33]. Høyrup sets this achievement in a slightly different light. Because the methods of the Old Babylonian scribes depended on what he calls *naive* cut-and-paste geometry, they had no need to prove anything - they could *see* it immediately. From this point of view, Greek mathematics isn't so much the invention of an entirely new discipline, but rather the natural next step in a continuing cycle of naive expansion followed by synthetical critique. A more recent example of such development would be the naive expansion of calculus in the century after Newton and Leibniz, followed by the synthetical critique of Cauchy and Weierstrass in the nineteenth century.

The bulk of Høyrup's book is devoted to transliterations, translations and commentaries for dozens of Old Babylonian algebraic or geometric texts. (Høyrup helps you read the transliterations by supplying a small dictionary of the Akkadian and Sumerian words involved.) There are three basic mathematical techniques on display in the texts: completing the square, as in the above example, scaling and what Høyrup calls "bundling" (what we might nowadays call changing variables, although it might also correspond to simply changing your units of measurement). There are other ideas too - even Pythagoras' Theorem makes an appearance - but there isn't room in a review like this to go into any more detail. I can only encourage you to delve into the book yourself!

The problems discussed also illustrate an interesting distinction between what we might call *mathematics in context* (as in the NZ school mathematics curriculum) and genuine *applications of mathematics*. The problems certainly deal with contexts familiar to the scribes (surveying and commerce, for example), but they can't really be thought of as genuine applications likely to arise in these contexts. Some of the problems, for example, show that there is a long history of inflicting on students pseudo-applications of quadratic equations. Here is a context which you might not have met before (paraphrased, with modern units, from pages 206-8):

> I have bought 770 litres of oil at an unknown price of p litres per dollar. I sold it at $s = p - 4$ litres per dollar. I made 40 dollars profit. What were the buying and selling prices?

What purpose could be served by being able to solve such problems? - a question echoed by many present day high school students! Høyrup sees it as a way of displaying scribal virtuosity, akin perhaps to the way later mathematicians used the solutions to cubic and quartic equations to display their virtuosity. Netz [**Net**, Section 7.3] has suggested a similar motivation for the development of Euclidean-style mathematics, as a way of establishing a professional identity. Perhaps that is the purpose it serves in our own education system?

There's lots more in this fascinating book, including a discussion of the relationship of Old Babylonian algebra to later developments in mathematics, and another contribution to the long debate on geometrical algebra (in what sense can Old Babylonian algebra be called algebra?) There is an interesting change in tone from the ground-breaking [**H**]. Perhaps because he was presenting a new theory then, [**H**] seemed to take greater pains showing why the old view was untenable, and discerning the actual meaning of some of the technical words (like *projection*). In the present book, with his theories now well established, Høyrup spends less time trying to persuade the reader, and more on simply presenting the new interpretation. Because of this, if you need persuading it may still be worth your while to acquire to copy of [**H**] as well.

Høyrup's "pedantically literal" translations can be awkward to read, but this is well worth the effort as they open up an alternative way of seeing things. For this reason alone, the book is essential reading for anyone interested in the development of mathematical thought.

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John Hannah
University of Canterbury

CONFERENCES

Conferences in 2003

January 4-11 (New Plymouth) **NZMRI Workshop on Combinatorics and Combinatorial Aspects of Biology**
See April Newsletter for fuller details.
email: Geoff Whittle geoff.whittle@vuw.ac.nz

June 2-4 (Melbourne) **WoPLA'03: Workshop on Parallel Linear Algebra**
website: http://www.iciam.org

July 7-11 (Sydney) **Fifth International Congress on Industrial and Applied Mathematics**
(including the 6th Australia-New Zealand Mathematics Convention, which incorporates both the New Zealand Mathematics Colloquium and the Annual Meeting of the Australian Mathematical Society
website: http://www.iciam.org

2002 INTERNATIONAL CONGRESS OF MATHEMATICIANS IN BEIJING

The 2002 International Congress of Mathematicians (ICM 2002) was held in Beijing, China from August 20-28, 2002. The ICM, held every four years, is the most important international conference for mathematicians.

The 2002 Fields Medals and the Nevanlinna Prize (both presented by the International Mathematical Union) were awarded by the Chinese President Jiang Zeming during the ICM opening ceremony, which took place on 20 August in the Great Hall of the People in Beijing. The first of this year's Fields Medalists, Laurent Lafforgue (Institute des Haute Etudes Scientifiques, Bures-Sur-Yvette, France) was honoured for making a major advance in the Langlands Program, thereby providing new connections between number theory and analysis. The second 2002 Fields Medalist is Vladimir Voevodsky (Institute for Advanced

Study, Princeton, New Jersey, USA). He was honoured for developing new cohomology theories for algebraic varieties, thereby providing new insights into number theory and algebraic geometry. The 2002 Nevanlinna Prize winner is Madhu Sudan, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. He was recognized for his contribution to probabilistically checkable proofs, to non-approximability of optimization problems, and to error-correcting codes.

Twenty mathematicians gave one-hour plenary lectures, designed to be comprehensible to a wide spectrum of mathematicians. Also, 167 mathematicians gave 45-minute invited lectures in specified sections. These lectures were surveys of significant topics in the specified area of research.

There were more than 6000 participants in this year's ICM, many of whom contributed short talks. The delegates from New Zealand contributed the following short talks:

- **Professor Kevin Broughan** (Waikato University),
- **Associate Professor Megan Clark** (Victoria University of Wellington),
- **Jianhua Gong** (The University of Auckland), "On quasiconformally homogeneous manifolds in space".
- **Chung Ju Tsai** (The University of Auckland), "Generalizations of Schimizu-Leutbecher's and Jørgensen's inequality for discrete groups".
- **Dr Dong Qian Wang** (Victoria University of Wellington), "Outliers in multivariate data sets".
- **Guohua Wu** (Victoria University of Wellington), "Interactions between c.e. degrees and d.c.e. degrees".

Professor Rob Goldblatt (Victoria University of Wellington) attended ICM 2002, but he delivered his invited address to a satellite conference in Chongqing.

Jianhua Gong
University of Auckland

NOTICES

RSNZ COMMITTEE ON MATHEMATICS AND INFORMATION SCIENCES, 1997-2002
Report to the Royal Society of New Zealand Mathematics and Information Sciences Electoral College

My term on the Council of the Royal Society of New Zealand (RSNZ) as the representative of the Mathematics and Information Sciences Electoral College, carrying with it the Chairmanship of the RSNZ Committee on Mathematics and Information Sciences, is about to conclude. Coupled with the announcement of the election of Associate Professor Andy Philpott as my successor, it is appropriate that I should provide the member bodies of the Electoral College an overview of the activities of this Committee during my tenure as its Chair.

MISC has gone through various constitutional changes since its initial conception. Originally created in May 1994 as the "New Zealand Mathematical and Information Sciences Council", under the convenorship of Prof Marston Conder it was able to link with the RSNZ which at the same time was undergoing reform to ensure greater participation of scientists and technologists within it sphere of activities through discipline based groupings. The establishment of "electoral colleges" signalled the possibility of bringing together representatives of various societies - NZ Mathematical Society (NZMS), NZ Statistical Association (NZSA), Operational Research Society of NZ (ORSNZ) and the Informatics Group of the NZ Computer Society (NZCS), as well as NZ Association of Mathematics Teachers (NZAMT), which is currently a member of the Science & Technology Education Electoral College, as well as Fellows of the RSNZ in the mathematical and information sciences, to form a grouping that would promote the advancement of these disciplines in NZ as well as provide liaison between the societies. This linkage was strengthened in September 1994 through the establishment of the Mathematical and Information Sciences Standing Committee (MISC) of the RSNZ with Professor Graeme Wake assuming the chairmanship of the committee, following his involvement as a member of the Interim Board of the RSNZ since 1992. The new Act took longer to get through Parliament than was initially anticipated and following a recommendation of MISC, in April 1997 I was appointed by the interim RSNZ Council as MISC Convener and a representative on its Council. The passing of the new Act relating to the RSNZ in 1997 brought with it the formal establishment of Electoral Colleges. The interim Council was charged with conducting elections for representatives of the Electoral Colleges and in 1998 I was duly elected. Such elected representatives can serve at most two terms of two years. In order to achieve rotation and continuity of membership on the Council I agreed to seek reelection in 2000, with my term concluding this year. That mechanism achieved the desired effect and every two years roughly half the council does not seek re-election. In recent years the RSNZ Council disbanded the concept of "standing committees" by establishing simply "committees" each of which provides the Council with a plan of action for the following year.

Immediately following my appointment as Chair of MISC, the RSNZ secured a contract with the Ministry

of Research Science and Technology to carry out a review of mathematical sciences within New Zealand. This was a major undertaking that took over a year to execute. The exercise proved to be very demanding but we were determined to do as good a job as we could. The Review Team consisted of myself as Chair, Professor David Vere-Jones, Associate Professor Stephen Haslett, Mrs Jean Thompson and Dr Mark Bebbington. We sought advice from Dr Noel Barton, the author of the Australian Review; produced a discussion document on future likely developments in various mathematical science areas; called for individual submissions; constructed, disseminated and analyzed questionnaires sent out to individuals and groups in a variety of different areas (universities, polytechnics, research organizations, professional associations and user groups); held regional workshop meetings in the main centres; and produced a final report "Mathematics in New Zealand: Past, Present and Future". The report identified areas of concern as well as opportunities. It provided a very valuable oversight of the mathematical sciences and was also used to provide an input into the Foresight process that was underway in the country at that time. The hard data that the review provided proved to be very useful particularly when making submissions and press releases, on behalf of MISC. These have been submitted in various situations and to various groups including the NZ Vice-Chancellors Committee, the Tertiary Education Advisory Commission, the parliamentary party spokespersons on tertiary education, appropriate Ministers of the Crown as well as an article in the NZ Education Review. These were in the main in relation to concerns in the funding of our disciplines, especially at tertiary level.

Besides acting as a coordinating body for the discipline groups we have tried to encourage member bodies to consider holding joint conferences. Many Societies prepare dates for these meetings well in advance and I would encourage you to look for such cooperative opportunities. In the past I can recall a successful joint meeting between the ORSNZ and the NZSA, as well as at least one Mathematics Colloquium overlapping with a NZSA Conference. One area of concern has been the inability of the committee to get formal representation of the computer scientists. The Informatics group of the NZCS no longer functions and we have no official representation of computer scientists. At the last annual meeting of MISC in March of this year Professor Phillip Sallis, and Professor Mark Apperley joined us to explore ways that we can effect such a linking without necessarily creating another professional society.

MISC now functions as a National Committee for two ICSU organizations - the International Mathematical Union (IMU), and the International Union of Theoretical and Applied Mechanics (IUTAM). The established policy is that "the IMU NZ representative serves for a four year period with any new appointment being made at the beginning of the year when the IMU holds its General Assembly. It is expected that the Representative would be the President of the NZMS". Professor Jeremy Astley took over the role of IUTAM representative from Professor Ian Collins and joined MISC in 2000. Recently he has been replaced by Dr Graham Weir, following Professor Astley's move to the University of Southampton. The RSNZ Council is currently reviewing it international commitments but the opportunities that we gain by continuing with our representation on these bodies is important for our international standing.

MISC typically convenes for a one-day meeting once a year with regular email communication conducted between the members when items, typically referred by the RSNZ Council, need addressing.

I would also like to remind the Electoral College that MISC can assist in bringing forward nominations for New Zealand Science and Technology Medals. It was great honour that Professor David Vere-Jones was the awarded the Gold medal (now called the Rutherford Medal) in 1999 as the top annual award to a scientist or technologist.

The RSNZ Council is also attempting to address the concerns of the Minister for Research, Science and Technology in that not enough scientists are put forward for New Zealand Honours. The Minister asked the RSNZ to take a lead in bringing forward nominations. The Chair of MISC can offer assistance to member bodies if they wish to seek the Royal Society's endorsement of such nominations.

I would also like to bring to the attention of members the existence of the Science and Technology Promotion Fund. MISC has also identified the need for a coordinated promotion of careers in the component disciplines. The committee is exploring the possibility of a suitable publication and up-to-date posters.

In welcoming Andy Philpott to the role of the Chair of MISC, I am delighted that we have achieved a rotation of representatives from the member bodies of the Electoral College - initially Graeme Wake from the NZMS, then myself from the NZSA, and now Andy Philpott from the ORSNZ.

Finally, I would like to express my appreciation of the support that I have received, as chair of MISC, from the various member body representatives. My role has been one of coordination, with secretarial support willingly provided by the RSNZ. In particular I would like thank those members of the Electoral College that served on MISC during my tenure as its chair - NZMS: Professor Douglas Bridges (1997-99), Professor Rob Goldblatt (1997-99), Professor Graeme Wake (2000-01), Professor Gaven Martin (2000-02), Professor Geoff Whittle (2002). NZSA: 1997: Mrs Jean Thompson (1997-99), Ms Sharleen Forbes

(1998-9), Associate Professor David Scott (2000-02), Associate Professor Stephen Haslett (2000-02). ORSNZ: Dr Jonathon Lermit (1997-98), Professor Tony Vignaux (2000), Associate Professor Andy Philpott (1997-2002), Dr John Davies (2002). In addition the following also served on MISC. NZAMT: Ms Sylvia Bishton (1997-2001), Mrs Jan Wallace (1997-2002), Ms Joanna Wood (2001), Mr Alan Parris (2002). RSNZ Fellows: Dr Alex McNabb (1997), Professor Derek Holton (1997-99), Professor Ian Witten (1998-2002), Professor Rod Downey (2000-02).

Professor Jeffrey Hunter
August 2002

CALL FOR INSTITUTIONS TO SET UP MATH-NET PAGES

The International Mathematical Union (IMU) has a *Committee on Electronic Information and Communication* (CEIC) that was set up to address issues arising from the emergence of the internet and electronic publishing, and the need for international standards on electronic communication between mathematicians. The CEIC has been extremely active, and has produced much advice and information for mathematicians, librarians and publishers about best practices concerning the use of homepages, preprints and archives, copyright issues, pricing, subscriber access et al. All of this is contained in a booklet *Recommendations on Information and Communication*, which can be read online or downloaded from the CEIC's website at

http://www.ceic.math.ca

The CEIC has issued a call to all mathematicians to make their publications available electronically, in order to enlarge the reservoir of freely available primary mathematical material. This will particular help scholars working without adequate library access. To facilitate this process, the CEIC has developed a software system called **Math-Net**, a web gate for mathematics departments and institutes that presents information in a standardized, well-structured, and easy-to-use format. Math-Net, in addition, provides tools and services that collect local information, e.g., about preprints and faculty members. The IMU asks all mathematics institutions to create a **Math-Net Page**, to install a prominent link to that page from its primary homepage, and to maintain its Math-Net Page in the future, see: http://www.math-net.org/Math-Net-Recommendation.html

Detailed information about creating and installing a Math-Net Page can be found at

http://www.math-net.org/Math-Net_Page_Help.html

Only a few steps are necessary to get going:

1. The institution appoints a information coordinator for Math-Net, for instance the webmaster.
2. The information coordinator generates a Math-Net Page. The Math-Net Page Maker http://www.math-net.org/pagemaker makes it easy to create a Math-Net Page.
3. The information coordinator installs the Math-Net Page at your Web server and sends an e-mail to math-net@zib.de with the local URL of the Math-Net Page.

Then your Math-Net Page will be listed in the Navigator database http://www.math-net.org/navigator, a Math-Net Service for efficient access to the Web sites of the Math-Net Members.

For any questions regarding Math-Net and the Math-Net Page please send e-mail to math-net@zib.de.

Rob Goldblatt

NZMS RESEARCH AWARD

This annual award was instituted in 1990 to foster mathematical research in New Zealand and to recognise excellence in research carried out by New Zealand mathematicians.

The NZ Mathematical Society Research Award for 2002 was recently made at the 2002 Mathematics Colloquium to Bakhadyr Khoussainov (University of Auckland) "for his prolific, insightful and penetrating investigations into logic, complexity and computability".

Other recipients to date have been John Butcher and Rob Goldblatt (1991), Rod Downey and Vernon Squire (1992), Marston Conder (1993), Gaven Martin (1994), Vladimir Pestov and Neil Watson (1995), Mavina Vamanamurthy and Geoff Whittle (1996), Peter Lorimer (1997), Jianbei An (1998), Mike Steel (1999), Graham Weir (2000), and Warren Moors (2001).

Call for nominations 2002/2003
Applications and nominations are invited for the NZMS Research Award for 2003. This award will be

based on mathematical research published in books or recognised journals within the last five calendar years: 1998-2002. Candidates must have been residents of New Zealand for the last three years.

Nominations and applications should include the following:

1. Name and affiliation of candidate.
2. Statement of general area of research.
3. Names of two persons willing to act as referees.
4. A list of books and/or research articles published within the last five calendar years: 1998-2002.
5. Two copies of each of the five most significant publications selected from the list above.
6. A clear statement of how much of any joint work is due to the candidate.

A judging panel of three persons shall be appointed by the NZMS Council in advance of the receipt of nominations. The judges may call for reports from the nominated referees and/or obtain whatever additional referee reports they feel necessary. The judges may recommend one or more persons for the award, or that no award be made. No person shall receive the award more than once. The award consists of a certificate including an appropriate citation of the awardee's work, and will be presented (if at all possible) around the time of the AGM of the Society in 2003.

All nominations (which no longer need to include the written consent of the candidate) and applications should be sent by 31 March 2003 to the NZMS President, Rod Downey, at the following address:

Professor Rod Downey
School of Mathematical and Computing Sciences
Victoria University
P0 Box 600
Wellington, New Zealand

Please consider nominating any of your colleagues whose recent research contributions you feel deserve recognition!

14th GENERAL ASSEMBLY OF THE INTERNATIONAL MATHEMATICAL UNION (IMU)

[New Zealand's representative at this meeting was Rob Goldblatt. Highlights of his report are below; please contact him if you would like his full report.]

The 14th General Assembly of the IMU took place during August 17-18, 2002, in Shanghai, China.

Mission
The statutory objectives of the IMU are

- to promote international cooperation in mathematics;
- to support and assist the four-yearly International Congress of Mathematician (ICM) and other international scientific meetings or conferences;
- to encourage and support other international mathematical activities considered likely to contribute to the development of mathematical science in any of its aspects, pure, applied, or educational.

Organisation
The IMU is affiliated to the International Council for Science (ICSU). There is an Executive Committee overseeing IMU activities, many of which are associated with various Commissions, including:

- ICMI: the International Commission on Mathematical Instruction, which organises the International Congress on Mathematical Education (ICME)
- CDE: the Commission on Development and Exchange, whose mission is to encourage the growth of mathematics in developing countries and support exchange of visits with member countries where there are obstacles (such as non-convertible currencies).
- ICHM: the International Commission on the History of Mathematics. This is a joint commission between the IMU and the International Union of the History and Philosophy of Science (IUHPS).

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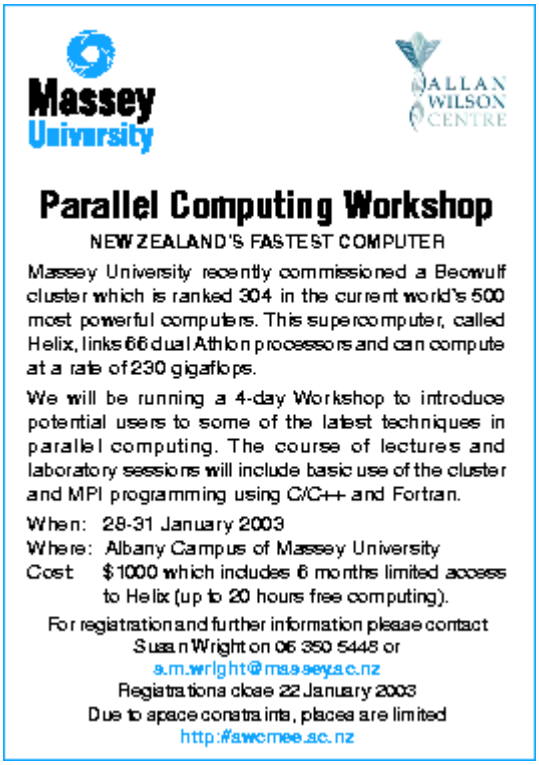
The Next International Congress of Mathematicians (ICM)
The 14th General Assembly resolved that the next ICM in 2006 will be held in Madrid, Spain. The Spanish National Committee for Mathematics submitted a very credible proposal, emphasizing the country's ninth ranking in the world for production of mathematical research, with 3000 university professors in 72 universities. It hopes to use to occasion to help the development of mathematics in Latin America, and increase mathematical relations within Spanish speaking countries.

New President and Executive Committee
The General Assembly elected Professor John Ball (UK) as the new IMU President, and re-elected Professor Phillip Griffiths (USA) for a further term as Secretary. There are two Vice-Presidents, from France and Japan, with the remaining five members of the Executive Committee coming from China, Germany, India, Norway and Russia. Particularly notable was the election of Professor Ragni Piene of Norway, the first ever female member of the IMU Executive.

On behalf of New Zealand I had formally submitted a nomination of Vaughan Jones to the Executive Committee, but his name was not included in the Executive Committee's slate. At the Assembly itself the Australian delegation then nominated Vaughan from the floor, and I spoke in support of this. In the end the voting went with the Executive's slate. It seems that an obstacle to support of the nomination was Vaughan's residential status in the USA, and the fact that there was already a USA candidate in an uncontested position on the Committee.

For further Information and references see the IMU website http://www.mathunion.org/. This contains a wealth of information about the IMU and its various activities, lists of member countries, and links to other mathematical sites. The 80 page Bulletin of the International Mathematical Union, No. 48, June 2002, can be downloaded from the IMU website.

Rob Goldblatt



AUSTRALIAN AND NEW ZEALAND INDUSTRIAL AND APPLIED MATHEMATICS
New Zealand Branch
Report of the Outgoing Chair, 2 December 2002, University of Auckland

This year has been an outstanding one for mathematics in general, and applied mathematics in particular, in New Zealand.

Manawatu-Wellington Applied Mathematics Conference
Igor Boglaev and Marijcke Vleig organised this year's conference, held on Friday 6 September 2002 at Massey University. About 20 people attended, to hear 13, 25 minute talks. Dinner was at the Wharerata Staff Club. In keeping with tradition, attendance at the conference was free.

NZ Hydrology-ANZIAM Workshop
A highly successful Workshop between the NZ Hydrological Society and ANZIAM (NZ) was held on 8 July 2002 at Industrial Research, Lower Hutt. Twenty attended, from Dunedin to Auckland, as well as some from overseas. The Workshop was interactive, with about one half of each speaker's time allocated for general interactive discussion. The dinner was a banquet at the Sungai Wang Restaurant, Lower Hutt. It is planned to hold another workshop in two years time. Paul White (p.white@gns.cri.nz) has put details of the workshop, and presentations, on the NZ Hydrological Society web site. Workshop participants were

charged $50, which covered all food, the banquet, and photo-copying.

NZIMA
A successful bid for a Centre of Research Excellence in mathematics, based in the University of Auckland, has resulted in a new institute called the NZ Institute of Mathematics and its Applications. An application to the NZIMA has resulted in $100,000 being allocated for postgraduate research fellowships to Massey University at Albany, as part of a Thematic Programme in Industrial Mathematics. Additional indirect funding from the NZIMA has allowed Warwick Kissling of Industrial Research access to Peter Hunter's super computing resources in Auckland, for PhD calculations of the large scale behaviour of the Taupo Volcanic Zone's geothermal fields.

Vaughan Jones Investiture
Vaughan Jones has been made a Distinguished Companion of the Order of NZ. This is a special honour to Vaughan, and indirectly, a special recognition of the role of mathematics in NZ. The Australian equivalent award was also granted to Noel Barton earlier this year for his contributions to mathematics in Australia.

Centre for Mathematics in Industry, Albany
From 1 March 2003, Graeme Wake will take up a position as Adjunct Professor of Industrial Mathematics, within the Centre for Mathematics in Industry (CMI). This Centre has been recently established within the Institute of Information and Mathematical Sciences (IIMS) at Massey University's Albany campus. The Director of the CMI is Robert McKibbin.

It is likely, if ANZIAM agrees, that Graeme will be the Director of MISG2004 and MISG2005.

Mick Roberts is moving from Wallaceville to an Associate Professorship at Albany.

Two New FRSNZs
Robert McLachlan and Graham Weir were elected Fellows of the Royal Society of NZ on November 21, 2002. Robert was awarded a personal chair at Massey University, earlier in the year.

Graham Weir

GRANTEE REPORTS

It was two months ago that I attended the International workshop on Finsler Geometry with my supervisor, Gillian Thornley, in a beautiful state in the United States of America, California, held in 3-7 June 2002. This workshop was organised by the Mathematical Sciences Research Institute in Berkeley with the support of famous mathematicians, S. S. Chern, Z. Shen, D. Bao and Robert Bryant. It followed a similar workshop held six years earlier.

Finsler geometry is an emerging branch of Mathematics, which appeared in 1918, after the pioneering work done by Paul Finsler, a German. Since then the subject has developed steadily. However, due to complicated tensor computations, Finsler geometry has made many beginners turn away from the subject. So mathematicians have also developed an index free form. It has broader applications in many areas of science and will continue to develop through the efforts of many geometers around the world. Finsler geometry uses families of Minkowski norms, instead of families of inner products, to describe geometry. There has been a steady modernisation of the field during the past decade. Within the last two years, several areas of Finsler geometry have experienced accelerated growth. These include Finsler spaces of constant curvature, as well as applications of Finsler methods to industrial and medical sectors.

The purpose of the workshop was to assess the current state of issues in the field, to provide a forum for technology transfer, to chart a course for the near future and to bring together a cross section of the researchers working on different aspects of Finsler geometry.

Some of the interesting talks:

Minimal Surfaces of Rotation in a Special Randers Space (Keti Tenenblat, Universidade de Brasilia, Brazil), On Randers Metrics of Constant Positive Curvature (Aurel Bejancu, Kuwait University, Kuwait), Randers Metrics and their Curvature Properties (X. Chen, China), Randers Space Forms and Yasuda-Shimada Theorem (H. Shimada, Hokkaido Tokai University, Japan), Ricci Curvature in Finsler Geometry (D. Bao, University of Houston, USA), Einstein Metrics of Randers Type (C. Robles, University of British Columbia, Canada).

There were several papers concerning the Randers space of constant curvature. This was studied first by H. Yasuda and H. Shimada in 1977. It was interesting to hear discussions on the Yasuda-Shimada theorem, which I have been using in my research. D. Bao & C. Robles had found a Randers space, which contradicted this theorem. The corrected version of Yasuda-Shimada theorem was given by both D. Bao & C. Robles and M. Matsumoto & H. Shimada in 2002 independently. So it was nice to have Shimada come

to the workshop and speak on it. I really enjoyed this because all talks were relevant to my research area. S. S. Chern was not able to attend the workshop because he was busy with organising the International Congress in China. We did have a nice videotaped interview with him.

There were 41 participants from Japan, USA, Canada, China, France, Hungary, Kuwait, South Korea, Brazil, Belgium, Germany, Italy, United Kingdom, Greece and New Zealand. I enjoyed this workshop and the talks presented there very much. Also it allowed me to meet experts in the field and other Ph.D. students, make more friends and discuss my research problems with other mathematicians. I really benefited from participating in this workshop.

I would like to thank the Institute of Fundamental Sciences, Mathematics, Massey University, New Zealand Mathematical Society and the Mathematical Sciences Research Institute, Berkeley, California for their financial support and giving me the opportunity to attend this workshop. Without this financial support I would have missed a valuable experience.

Finally I thank my supervisor, Gillian Thornley, for her continuous support and encouragement given to me until the end of the workshop.

Padma Senarath
Massey University

THE NEW ZEALAND MATHEMATICAL SOCIETY

Report from the Membership Secretary to the 2002 Council Meeting and AGM

Numbers

The Society currently has **235 members** which sees a slight drop from last year, mostly attributable to fewer free students.

The Newsletter is also sent to 65 other recipients, mainly mathematical societies and libraries.

The breakdown of membership classes, together with comparisons with recent years and current subscription fees (excl GST), is:

1995	1996	1997	1998	1999	2000	2001	2002		
158	154	150	152	146	156	158	157	Ordinary	$34.00
18	16	18	20	18	19	18	18	Reciprocal	$17.00
			2	2	1	2	3	Overseas Student	$17.00
43	49	31	36	21	25	29	28	Student	$ 7.20
14	5	8	6	5	4	3	3	Free one-year	—
60	25	24	26	18	15	12	7	Free Student	—
12	14	13	13	15	16	16	15	Honorary	—
1	1	1	1	2	3	4	4	Life	—
306	**264**	**247**	**256**	**226**	**239**	**242**	**235**	**Totals**	

(There is a small discount for early payment.)

Free Student memberships

There was a surprising absence of student members taking up the free one-year subscription. The number has dropped again from last year's low. All students enquiring about becoming a member are offered free membership, and HODs are also asked for nominations at the start of each academic year. Only two responses were received from the latter, despite a reminder. If the Society continues to regard this membership class as a valuable means of gaining long-term members, then some discussion into the reasons for disinterest may be appropriate.

NZ Journal of Mathematics

Currently 77 members subscribe, compared to 80 in 2001, 79 in 2000, 85 in 1999 and 126 in 1998.

Credit Card payments

The Treasurer may wish to consider the pros and cons of allowing credit card payments of subscriptions. This would offer members an alternative form of payment, convenient especially to those overseas. The processing of overseas cheques and bank transfers would also be eased. How the Membership Secretary would process credit card payments could be investigated.

The collection and administration of subscription fees progresses smoothly and I will be happy to continue in the position of Membership Secretary.

John A Shanks, Membership Secretary
25th November 2002

MATHEMATICAL MINIATURE 19

Bradman, Beethoven, Brown and Bolt

In 1948, or thereabouts, Mr Cave, a science teacher at my school in Taumarunui, was talking to his class about cricket, which he must have found kept the attention better than science. He described, as bad batting practice, a certain dangerous stroke. A boy piped up ``But Sir, Donald Bradman plays that shot". ``Oh yes," Mr Cave replied, ``but he is a master".

In 1954, I was taught, in a harmony class, that it is best to begin and end a piece of music with a tonic chord in the root position. In A minor, this chord would contain the notes A, C and E, with A in the bass part. The worst possible alternative would be to have E in the bass part. The second movement of the Beethoven seventh symphony was put up as a counterexample. Almost repeating Mr Cave's words, the lecturer reminded us that Beethoven was a master.

In mathematics, and sciences that use mathematics, there is sometimes the opportunity and the temptation to act like masters, substituting intuition for careful reasoning. Also in the 50s, I had the benefit of learning Physics from Professor Dennis Brown. In the arrogance of youth, I questioned an approximation he used for `n!`, as a step in a more extended argument. Technically I was right but sometimes physicists can use mathematics intuitively and informally and get away with it. It is like playing a bad cricket shot but scoring from it or composing unconventional music that sounds good. It is, however, also like faking the evidence in a criminal trial as the best means of putting a presumably guilty person behind bars.

In about 1959, during my first few years as a lecturer in Applied Mathematics, I criticised as pedantic the work of a very good student. The student was analysing the possible stability of a sequence of approximations to the solution of a differential equation. His work was perfect but I advocated instead, a clumsy argument which destroyed the elegance and the subtlety of the student's result. My older colleague, Bruce Bolt, gently taught me that in both Pure and Applied Mathematics, as well as in cricket and music, sloppiness is not, in itself, a virtue.

Deriving a good approximation to `n!` is no harder, and much more beautiful, than finding a bad approximation. Here is one way it could be done. Let `n` be a positive integer and calculate $\int_{-1/2}^{1/2} \log(n+t)dt$ using first integration by parts and secondly by term by term integration of the series expansion of $\log(1+t/n)$. We find

$$(n+\tfrac{1}{2})\log(n+\tfrac{1}{2}) - (n-\tfrac{1}{2})\log(n-\tfrac{1}{2}) - 1 = \log(n) - T\ ,$$

where

$$T = \frac{1}{2\cdot 3\ (2n)^2} + \frac{1}{4\cdot 5\cdot (2n)^4} + \frac{1}{6\cdot 7\cdot (2n)^6} + \cdots$$

I now claim that

$$\frac{1}{24n\ -12\ +4/(2n-1)} \quad \frac{1}{24n+12+4/(2n+1)} < T < \frac{1}{24n-12} - \frac{1}{24n+12}.$$

The first of these inequalities holds because the expresssion on the left is less than the the first term of *T*. The second inequality follows by writing the right-hand-side as 1/24(n^2-1/4) and expanding in a geometric series; the terms can be compared in turn with the terms in *T*. Let

$$a_n = \log(n!) - (n+\tfrac{1}{2})\log(n+\tfrac{1}{2}) + (n+\tfrac{1}{2}) + (24n+12+4/(2n+1))^{-1},$$
$$b_n = \log(n!) - (n+\tfrac{1}{2})\log(n+\tfrac{1}{2}) + (n+\tfrac{1}{2}) + (24n+12)^{-1}.$$

From our already established inequalities, it follows that

$$a_{n-1} < a_n < b_n < b_{n-1}$$

Furthermore, the limits as $n \to \infty$ of a_n and b_n are each equal to $\log\sqrt{2\pi}$. Hence, for any fixed *n*, we have the approximation

$$n! \approx \sqrt{2\pi}\left(\frac{n+\frac{1}{2}}{e}\right)^{n+\frac{1}{2}} \exp\left(\left(24n+12+4\theta/(2n+1)\right)^{-1}\right)$$

where $\theta \in (0,1)$. The standard form of Stirling's approximation

$$n! \sim \sqrt{2\pi n}\left(\frac{n}{e}\right)^n$$

easily follows. The proof that a_n and b_n have limiting values $\log\sqrt{2\pi}$ is left as an exercise with several alternative answers. If interest is expressed, I will go over this detail in a later MINIATURE. In the meantime a moral: "Important though it is to think outside the square, it is also important to think inside the square".

Professor Brown died this month, aged 100. This MINIATURE is respectfully dedicated to the memory of this inspiring Physics teacher.

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