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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY

Contents

PUBLISHER'S NOTICE

This newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was edited by Alex James with Phil Wilson, assembled by Julie Daly and Pauline Auger and printed at University of Canterbury. The official address of the Society is:

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Web Sites

The homepage of the New Zealand Mathematical Society is:

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

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PRESIDENT'S COLUMN

In 2006 the Australian Academy of Sciences issued the report *"Mathematics and Statistics: Critical Skills for Australia's Future"*[1] calling for "urgent action" to (amongst other things) increase tertiary funding for mathematics, fund a national mathematics institute (AMSI), and fund a campaign to raise the profile of graduate careers in mathematics. In 2007 the outgoing Howard government increased the funding per tertiary mathematics student by 50%, while per capita funding for law and accounting was slashed. Towards the end of that year there were complaints that this money was not reaching mathematics departments, and in May 2008 the new Rudd government halved the compulsory student fees for mathematics students, compensated the universities for this, and will make sure the benefits are delivered. Indeed, according to Julia Gillard, Minister for Education, "We will be making it perfectly clear to universities what it's for and the policy objective there. We obviously want our maths and science faculties to be able to teach quality maths and science... you should expect to see accountabilities [sic] in that area of the Budget and in relation to Budget funding generally."

All in all, a remarkable outcome from the review and fantastic news for mathematics and mathematics students in Australia.

This was part of the background that triggered the mathematical and information sciences committee of the RSNZ to consider such a review in New Zealand. Members of the committee and of the NZMS Council met with Hyam Rubinstein (chair of the AAS local working party) on 18 July to ask him just how they did it. In brief: the ARC, AustMS, and Stat. Soc. Aus. provided the funding of $120K; the international panel (Jean-Pierre Bourguignon, Director IHES; Brenda Dietrich, Director IBM Watson Research Centre; Iain Johnstone, Stanford) spent a fortnight in Australia interviewing at universities, professional societies, and industries; two media consultants distilled the resulting vast amount of material down to a short, clear, hard-hitting report and arranged for maximum media coverage (even Hyam's taxi driver knew about it); and the report was released at a Canberra forum held just before the budget.

Extremely well executed and a richly-deserved response from the Government on the biggest-ticket request.

Of course, the situation in Australia was dire indeed, with the average staffing reduction in mathematics departments across Australia running at 40% in a decade and companies like BHP and large pharmarceutical companies unable to hire trained staff. But there are enough similarities that we should pay close attention — a feeling of shaky standards in schools and universities, international competition for mathematically skilled staff, insufficient cooperation between academia and industry, a lack of sound careers advice and awareness.

We'll put out a proposal for action by the end of the year; comments or contributions are welcome at any time.

Many thanks to Mark McGuinness who has done a great job as Newsletter Editor since April 2006; as he will be on sabbatical next year he is passing the baton to Alex James. Many thanks and good luck, Alex!

Robert McLachlan
Massey University

[1]The Australian review is at `http://www.review.ms.unimelb.edu.au/Report.html`. Two other interesting international reviews are the DOE Brown Report on future directions in applied mathematics, at `http://brownreport.siam.org`—particularly good on how to foster genuine innovation, discovery, and risk-taking by scientists—, and the OECD Global Science Forum report on Mathematics in Industry, at `http://www.smithinst.ac.uk/News/OECDReport`, which is in striking agreement with the Brown report on the hot areas of applied maths.

EDITORIAL

Kia ora koutou.

Welcome to this edition of the newsletter, edited at Canterbury for, as far as we are aware, the first time in around 25 years. When I agreed to take the job I was told apocryphal tales of academics working into the middle of the night cutting and pasting the original way. These were followed by long stories of editors that had fallen by the wayside, buried under mounds of paperwork. Not wishing to tempt the ill winds of fate, I have found the job thoroughly satisfying so far. I feel perfectly placed to keep my finger on the mathematical pulse of the nation and can be proud of being first with all the best gossip! I should also remember that the position has been much simplified by the excellent work of previous editors in instigating easy-to-use templates and systems. Additionally the support of an excellent team at Canterbury — Phil Wilson as deputy editor, Julie Daly, Pauline Auger and Dietrich Radel as technical support — will no doubt prove invaluable.

I hope that during my time as editor I will be able to add to the long tradition of improvements or at the very least not make matters worse. In the meantime, if you have any ideas for content, improvements or just encouraging thoughts, please send them to us at nzmseditor@math.canterbury.ac.nz. Alternatively, all gripes, moans and tales of woe can be sent to mark.mcguiness@vuw...

Alex James
Editor

LOCAL NEWS

AGRESEARCH

Dr Paul Shorten was awarded the 2008 NZBio Emerging Biotechnologist of the Year Award, which is presented to a scientist under the age of 35 whose achievements demonstrate the potential for future leadership in biotechnology. Paul was presented the award by the Minister of Science and Technology, Hon. Pete Hodgson, at the annual NZBio conference dinner in April 2008. Dr Shorten works in the area of Theoretical Biology and uses mathematics as a tool to integrate the flood of data collected in the laboratories of different science disciplines. Theoretical work is not often recognised for its contributions to the biotech field and this award acknowledges the contribution of mathematics to biotechnological progress.

Dr Paul Shorten (right) receives the 2008 NZBio Emerging Biotechnologist Award from the Minister of Science and Technology, Hon. Pete Hodgson.

We farewell David Saville who leaves AgResearch after 34 years with the company. David is now a freelance biometrician and has opened his own statistics consultancy business Saville Statistical Consulting Limited based in Christchurch. We wish David all the best for the future.

Paul Shorten

THE UNIVERSITY OF AUCKLAND

DEPARTMENT OF ENGINEERING SCIENCE

Andrew Pullan has taken the reins as new Head of Department since February. Contrary to persistent rumours no new dress code has been issued and even Andrew is sometimes seen with long trousers. Andrew follows Andy Philpott who is on well deserved sabbatical after his term.

From 7-12 January, the department was host to the 19th International Conference on Multiple Criteria Decision Making with the theme "MCDM for Sustainable Energy and Transportation Systems". Matthias Ehrgott and his organizing team (Ivan Kojadinovic, Richard Lusby, Andrea Raith, Lizhen Shao, Judith Wang, Hamish Waterer and Oliver Weide) even got the weather sorted for the week. Lots of positive comments prove that the 125 participants from all over the world enjoyed both the scientific and social programme.

Two new staff joined the department. Dr Richard Clarke (lecturer) has a PhD from the School of Mathematics, University of Nottingham. His research is in the area of mathematical models for continuum mechanics, in particular fluid dynamics. Dr John Cater (senior lecturer) has a PhD in Mechanical Engineering from Monash University, Australia. His research is in the field of turbulent fluid mechanics and aero-acoustics. He is trying to make aircraft engines quieter.

In February, Lizhen Shao completed her PhD on "Multiple Objective Linear Programming in Radiotherapy Treatment Planning" and has taken up a university sponsored postdoc position to continue her work with Matthias Ehrgott.

Stuart Donovan recently completed his ME receiving first class honours. His thesis was titled "Whither the wind blows: Improved techniques for wind flow modelling and wind farm layout optimisation". He was supervised by Rosalind Archer and Hamish Waterer.

The department has hosted a number of long term visitors this year: Prof. Gerard Cachon, Wharton School of Business, University of Pennsylvania, Prof. Sarah M. Ryan, Iowa State University and Prof. Kim Allen Andersen, Aaarhus Business School (Denmark) being on sabbatical leave from their home institutions. Kim has been working with Matthias Ehrgott on the solution of multiobjective combinatorial optimization problems. Sarah collaborated with Andy Philpott and Golbon Zakeri on trade-offs between expanding the capacity of fuel networks that underlie an electricity market versus expansion of transmission line capacities of the electrical network itself. Gerard also worked with Golbon and Andy on strategic timetabling in airline revenue management.

Martyn Nash hosted Prof. Sasha Panfilov and Rikkert Keldermann (University of Utrecht) for a one month research visit developing a modelling framework for investigating coupled electromechanical function of the heart. Assistant Prof.

Dan Ennis (UCLA) also visited Martyn for three months to work on models to integrate structural and functional information derived from cardiac magnetic resonance imaging.

PhD students Jan Zazgornik (University of Natural Resources and Applied Life Sciences, Vienna, Austria) and Florian Zink (University of Pittsburgh, USA) came to New Zealand for 3 months to carry out joint research with members of the Operations Research group. Florian is working with Hamish Waterer on optimization in thermoacoustics, Jan worked with David Ryan and Matthias Ehrgott on an optimization model for container transport in the forestry industry. Florian's visit is part of the East Asia and Pacific Summer Institutes (EAPSI) Program which is offered jointly by the NSF in the US and our RSNZ.

Listing all the short term visitors would be beyond the scope of this report, you can see their names from the list of seminars.

Don Nield contributed a talk on "New themes in convection in porous media" at the Applied Mathematics One-Day Meeting held on 9 June at the Department of Mathematics, University of Auckland.

In July a delegation of three staff (David Ryan, Stuart Mitchell and Matthias Ehrgott) and three PhD students (Oliver Weide, Andrea Raith and Richard Lusby) attended the 18th Triennial Conference of the International Federation of Operations Research Societies in Sandton, South Africa. At the dinner David Ryan presented NZ as "home of the second best rugby team in the world". However, the presentations of our PhD students were second to none!

An important event in the near future needs to be mentioned: the department is celebrating 40 years since the first graduation, and 45 years as a department. All TAM/EngSci graduates are invited to a celebratory birthday dinner at The Langham Hotel, Symonds St, Auckland on 30 August 2008. More details are at

http : *//www.esc.auckland.ac.nz/engsci*40/

Seminars

Lizhen Shao, "Multiple Objective Linear Programming in Radiotherapy Treatment Planning"

Jan Zazgornik, University of Natural Resources and Applied Life Sciences, Vienna (Austria), "Container Scheduling in Wood Transport"

Kim Allen Andersen, Aarhus Business School (Denmark), "The Bicriteria Multi- modal Assignment Problem"

Mark Craddock, International Power, "Operations Research at International Power"

Sarah Ryan, Iowa State University (USA), "Effects of Cost Forecast Bias in a Stochastic Programming Model of Bulk Energy Flows in the U.S."

Sam Na, "Optimisation of the Injection Compression Moulding Process"

Meng-Hsi (Jackson) Wu, "Automatic Generation Control (AGC) for NZEM"

Laleh Haerian, "Development and Computational Testing of New Polyhedral Algorithms for the Solution of Difficult Combinatorial Optimization Problems"

Ziming Guan, "Sales and Inventory Optimization Models in the New Zealand Dairy Industry"

David Goodrich, United States Department of Agriculture (USA), "Distributed Catchment Modeling: Overview and Challenges in Parameter Identification, Optimization, and Utilization of Internal Observations"

Florian Zink, University of Pittsburgh (USA), "Optimization Applied to Thermoacoustics"

Jeff Kilby, "Signal Analysis and Classification of Surface Electromyography Signals"

Richard Clarke, "Hydrodynamics of Oscillating Microcantilevers"

Eddie Anderson, University of Sydney (Australia), "Equilibria in Supply Functions: Do They Exist and What Do They Look Like?"

Par Holmberg, Uppsala University (Sweden), "Supply Function Equilibria: Step Functions and Continuous Representations"

Sasha Panfilov, University of Utrecht (The Netherlands), "Integrative Computer Modelling in Cardiac Electrophysiology"

Rikkert Keldermann, University of Utrecht (The Netherlands), "Effects of Heterogeneous APD Restitution in an Anatomically-based Model of the Human Ventricles"

Dan Ennis, UCLA (USA), "Myocardial Structure"

Thomas Desaive, University of Liege, (Belgium), "Physiological Modeling of the Cardiovascular System: From Experiments to Clinical Applications"

Matthias Ehrgott

UNIVERSITY OF CANTERBURY

DEPARTMENT OF MATHEMATICS AND STATISTICS

David Robinson will be leaving us in November and moving to Wellington. He was a permanent staff member for a long time; since he retired eight years ago he has made a major contribution to our teaching programme in algebra and discrete mathematics. Altogether he has been in the department for forty-seven years! Arno Berger has resigned to take up a position at the University of Alberta, Edmonton. We wish both David and Arno the very best. Three of our recently finished or finishing PhD students — Ronald Begg, Hannes Diener and Peter Humphries — are working on lecturing contracts to help fill the gaps left by Arno and David.

Douglas Bridges was one of the non-EU applicants for a major European Commission project on "Constructive Mathematics: Proof and Computation", which has just been awarded funding under the new IRSES scheme. The project will link groups working in the Universities of Munich, Padova, and Uppsala, the Japan Advanced Institute of Science & Technology, and our department here at Canterbury. The two-year funding from the EU will support research visits to Canterbury (and to Japan) by the EU-based researchers. Counterpart funding from NZ will support visits by Canterbury-based mathematicians to the EU groups involved in the project.

The Biomathematics Research Centre has acquired a "LifeSize Room" high definition videoconferencing system — capable of high-quality video conferencing with up to 1280 x 720 at 30 frames-per-second video. The system is a standards-based point-to-point and multi-point communication system which supports 4-way video and/or voice calling and is compatible with systems produced by Tandberg and Polycom.

In June, Charles Semple, Mike Steel and their PhD students Mareike Fischer and Beata Faller spent a week in southern France at the conference "Mathematics and Informatics in Evolution and Phylogeny". The meeting was held at an old villa in the countryside near Montpellier which hosts up to two groups at any time. (The mathematical meeting coincided with another group which had gathered for 'herbal massage, body image and sexual grounding' — providing a colourful, and at times eye-opening, contrast!). The meeting was a follow-up to one organised in May last year in New Zealand (by Allen Rodrigo and Olivier Gascuel) under a Dumond D'Urville funding grant to encourage NZ-French collaboration. Later that month Mike, Mareike and Beata (and postdoc Bhalchandra Thatte) attended a week-long meeting in Budapest at the Renyi Institute on Bayesian phylogenetic methods.

Rick Beatson has been travelling: he gave a talk at the conference on "Mathematical Methods for Curves and Surfaces" in Tonsberg, Norway, and moved on to work with groups at the University of Leicester, the Helmholtz Center in Munich, Germany, and the University of Strathclyde in Glasgow, UK, on various aspects of basis function methods. Alex James gave a talk at the 2008 AIMS conference in Arlington, Texas in April and Raaz Sainudiin attended the 7th World Congress in Probability and Statistics in Singapore in July. Also in July, Phil Wilson gave a talk at the European Consortium for Mathematics in Industry in London, UK. Jennifer Brown gave talks at the International Statistical Ecology Conference in St Andrews and the International Biometric Conference in Dublin, both in July. Mark Hickman spoke at the Foundation of Computational Mathematics Conference in Hong Kong in June and Marco Reale and Carl Scarrott both spoke at the 2nd International Workshop on Computational and Financial Econometrics in Switzerland in June. Ben Martin gave a talk at the Oberwolfach meeting on Groups and Geometries in April, then visited some collaborators in Bochum, Germany. Clemency Montelle gave a talk at the 2008 Australasian Association for the History, Philosophy and Social Studies of Science Conference at RMIT in Melbourne in July.

Congratulations to Phil Wilson, whose poster "A general model of lung tumour motion" (with Jürgen Meyer) won equal first prize in the open category at the European Consortium for Mathematics in Industry 2008. Equal first also was Winston Sweatman, so it was a clean sweep for the New Zealanders. The meeting was held in London in early July. Congratulations also to Rachael Tappenden, who was awarded a three-year PhD scholarship from NZIMA.

Alex James and Clemency Montelle travelled to darkest Timaru one Friday evening as part of the department's Mathematics Enrichment outreach programme. They ran two workshops for nearly a hundred students and teachers from all over south Canterbury: one on "What Not To Wear: An Unorthodox Introduction to Mathematical Topology"

and one on "Lizards, Birds, Possums and Maths — What Happens when a Mathematician gets Interested in Biology?". The audience took part enthusiastically in activities such as classifying the letters of the alphabet up to homotopy (apparently it depends what font you are using). Particularly popular was the ecological modelling exercise using chocolate M&Ms; rumour has it that all of the populations quickly became extinct.

One of our PhD students, Anna MacDonald, has received two honours this month recognising her research achievements and potential. Anna presented a poster on her recent PhD research entitled "Quantile Estimation using Extreme Value Mixture Models with Application to Neonatal Physiological Measurements" at the Australian Statistical Conference 2008 in Melbourne and won second prize in the poster competition. This research is part of joint work within the Neonatal Research Group at UoC currently consisting of Carl Scarrott, Dominic Lee, Marco Reale, Dr Glynn Russell (Guy's and St Thomas' Hospital, London) and Dr Brian Darlow (Canterbury DHB) and two other PhD students, Xin Zhao and Marina Zahari. Thanks are due to Paul Brouwers for his artistic wizardry.

Anna has also been awarded a TEC Top Achievers PhD scholarship. She will be researching extreme value modelling techniques for determination of neonatal health status under the supervision of Carl Scarrott, Dominic Lee, Glynn Russell and Brian Darlow.

Clemency has recently taken over as our seminar organiser. She has introduced a new format: a thirty-minute general talk followed by a five-minute break for refreshments, then another twenty minutes or so of questions and discussion. The format is working well and we are grateful to the speakers who have gone to great effort to make sure their talks are accessible to all. As well as these general colloquium-style talks, there is the occasional more technical specialist talk.

Congratulations are also due to Clemency who recently came in the top three lecturers in the College of Engineering for the UC Student Association Lecturer of the Year Award. Rick Beatsen, Carl Scarrott and Bill Taylor were also nominated from our department.

Preparations are continuing for the 7th Australia-New Zealand Mathematics Convention, which will be held here from December 8–12. The conference webpage is at

*www.math.canterbury.ac.nz/ANZMC*2008/

The online registration form should be going live very soon.

Recent visitors include: David Sutton (York, UK), Prof Ron Christensen (New Mexico, USA), Prof Christopher Bose (Victoria, Canada), Prof Rick Laugesen (Illinois at Urbana-Champaign, USA), Dr Tim Burness (Auckland/Southampton, UK) and Dr Christopher Voll (Southampton, UK).

Seminars

Dr Alistair Smith (Beca Engineering), "The basics of transport modelling and accident prevention"

Dr Charles Semple (Canterbury), "Combinatorial problems in conservation biology"

Dr Malte Peter (Auckland), "Homogenisation problems in PDEs: reaction-diffusion processes"

Dr Peter Smith (Canterbury), "Why is a statistician working on mobile phones?"

Prof Mike Steel (Canterbury), "The joys of being mean: tricks for (evolutionary) trees"

Dr Vivien Kirk (Auckland), "Designing experiments using mathematics: nonlinear dynamics and calcium oscillations"

Dr Tim Burness (Auckland/Southampton, UK), "Simple groups, bases and probability"

Prof Rick Laugesen (Illinois at Urbana-Champaign, USA), "Frequency-scale systems and the solution of the Mexican hat problem"

Ben Martin

MASSEY UNIVERSITY

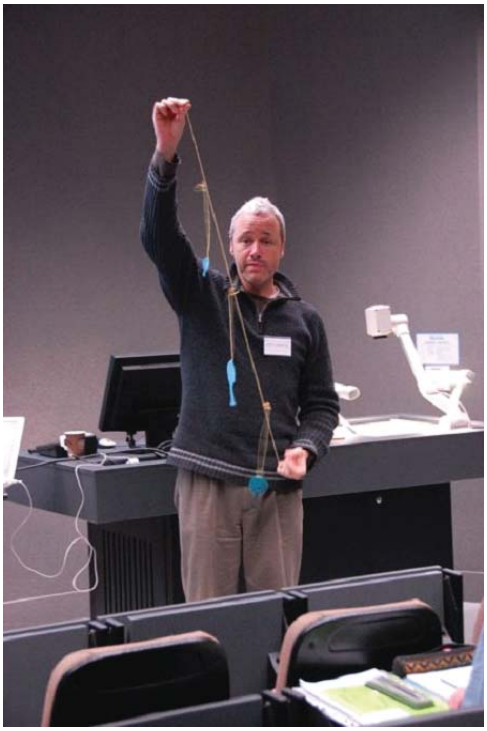
INSTITUTE OF FUNDAMENTAL SCIENCES (PALMERSTON NORTH)

"Partir c'est mourir un peu"

From Mike Hendy: A few weeks ago we celebrated the contribution of one of Massey's longest serving mathematicians, Peter Kelly, who has just retired. Peter, after completing his MSc at Auckland University, joined the Mathematics Department at Massey University in 1970. Although his plan at the time was to stay in Palmerston North for about 5 years, he remained a mainstay of the discipline here for the next 39.

Peter's contribution has mostly been to the teaching programme, mainly in undergraduate areas where he has developed courses at all levels, particularly in algebra. In conjunction with Les Foulds, Peter developed the very popular graduate level course "Graph Theory Algorithms", a course that a number of our PhD students have benefited from in their research studies. He also developed the service courses to support the Business Studies students, and in recent years has provided a major support for our entry level students.

Peter has been an enthusiastic participant in our department's extramural programme and has built up a reputation of support for our distance students. Peter's contribution will be missed. Peter and Marilyn plan to continue residing in Palmerston North, so his "5 years" are not yet up! We are sure to have the benefit of continuing contact with Peter.



It was nice that John Giffin came all the way from Christchurch to attend Peter's function held at the Staff Club Wharerata. Last week Peter finished the archaeological dig through the paper piles in his office which has now been transformed into an empty space.

Dion O'Neale and Robert McLachlan attended GLADE 2008 conference and workshop in held in Auckland 14th to 25th July. Dion reports: The meeting was held as a celebration of the 75th birthday of one of the founders and proponents of general linear methods (GLMs) for differential equations, John Butcher, and attracted a large number of international participants. Around 70% of the sixty-odd people at the meeting were from outside New Zealand.

The first week of the meeting took the form of a conference. Robert McLachlan from Massey P.N. gave a particularly demonstrative talk on "Structure in B-series for Hamiltonian systems" — a topic which traditionally explained with detailed calculations rather than demonstrations with string and cardboard trees.

The second week of the meeting was more informal and was run as a workshop with presentations and discussions on various open problems, interspersed with more formal presentations one of which I presented on "Trigonometric integrators, resonance and high oscillation". The meeting also included several social events: an excursion to see the gannet colony at Murawai beach, a conference dinner, a workshop dinner and an evening at the home of John and Jenny Butcher which included some amazing singing performances.

The first group of business students from China's Wuhan University have arrived at Massey's Palmerston North campus. The 39 students, all finance majors, are part of the 2+2 Pathway Programme arranged by the two universities in 2006. The programme will involve cohorts of students from the Wuhan World Trade Organisation School studying for two years at home then moving to New Zealand for two years to complete their business degrees at Massey. As part of this programme these students are enrolled in 160.131, Mathematics for Business Studies. Wuhan, in central China with a population of about 7 million, has one of the world's largest universities ; about 100,000 students live on campus.

Congratulations to Philip Zhang who (after some thorough grilling by the external examiner) has successfully defended and been awarded his PhD thesis on "Dynamics and Numerics of Generalised Euler equations". He is now a Postdoc at IRL working with Graham Weir and Shaun Hendy on homogenization for nanoscale materials.

Robert McLachlan was one of three New Zealanders at FOCM, the triennial international workshop on the Foundations of Computational Mechanics, this year held at City University in Hong Kong. He spoke on "Energy-preserving integrators and the structure of B-series", a talk he was able to recycle the following week at GLADE in Auckland, with no overlap of audiences. The highlights of Hong Kong were a coastal hike (where he managed to catch up with the group despite giving them an hour and three-quarters lead) and a level 8 typhoon that the western media referred to as a "death storm", in reality no worse than a windy night in New Zealand.

And speaking about the weather, Bruce van Brunt and family were trapped at home in the Pohongina Valley due to the severe storm on Tuesday the 29th and Wednesday the 30th of July. Bruce just managed to ring Marijcke at 8:30 on Wednesday morning to ask her to cancel his 9:00 lecture. He had already been without power for hours but now the telephone went down shortly after this call. By this time the storm intensified and the destruction of trees started. Bruce quickly shifted his car away from trees and a blessing that was as those trees did come down. Bruce managed to get to work the following day. The power was restored by late Friday afternoon but six days later still no telephone connection.

But that was the Pohongina Valley and not Palmerston North. PN is not so bad after all to live in, although for some reason, it is looked down upon. No traffic jams, no landslides, no tornados, no floods, no snow, no bush fires, no fog, no closures of the airport etc. Dull? Thank goodness!

Allan Wilson Centre news

Barbara Holland reports: As of the 1st of July the Allan Wilson Centre entered a second 6 year round of CoRE funding. Mike Hendy and David Penny will be stepping down from their roles as co-directors of the centre. Both will remain as principal investigators, and no doubt enjoy the reduced administrative demands! The position of director has been advertised, and we had visits from two inspiring candidates in May.

Two new principal investigators have joined the Centre: Dr Richard Newcomb of HortResearch, Auckland, and Prof Paul Rainey of Massey University, Auckland. There are also 9 new associate investigators: Dr Thomas Buckley, LandCare, Auckland; Dr David Bryant, Auckland University; Dr Alexei Drummond, Auckland University; Dr Howard Ross, Auckland University; Dr Barbara Holland, Massey University, Palmerston North; Dr Nicola Nelson, Victoria University; Dr Peter Ritchie, Victoria University; Associate Professor Charles Semple, Canterbury University; and Dr Jon Waters, Otago University.

This semester we have 10 students visiting the Allan Wilson Centre at Palmerston North from the University of Greifswald, Germany. The exchange scheme is part of their major in mathematical biology and has now been running for 4 years. The students are taking papers in the Maths, Statistics and Biology disciplines and are all also doing a small research project within the Allan Wilson Centre. For their projects many of the students will be working on datasets and research problems generated by the Solexa sequencing machine. Since its opening in October last year the Solexa has produced 8 Terabytes (or as we like to say "TerrorBites") of DNA sequence data.

Seminars

Dr Brett Ryland (University of Bergen, Norway), "Multivariate Chebyshev polynomials and applications".

Professor Gregory Derfel (Ben-Gurion University, Israel), "Equations with rescaling and the pantograph equation".

Dr Tom ter Elst (The University of Auckland), "Does diffusion determine the drum?"

Professor Jrg Frauendiener (University of Otago), "Compatible discretisations in general relativity".

Dr Mike Newman (Victoria University of Wellington), "Partition groups".

Dr Simon Schurr (Department of combinatorics and optimization, University of Waterloo, Canada), "Strong duality and stability in convex optimization".

Graduate Seminars Series

Fleur McDonald, "Symmetries of elementary cellular automata".

Dr Catherine McCartin, "Parameterized Algorithms".

Marijcke Vlieg-Hulstman

INSTITUTE OF INFORMATION AND MATHEMATICAL SCIENCES (ALBANY)

In April, Gaven Martin delivered a lecture entitled "Way beyond the parallel postulate: the revolution in modern geometry" as part of Massey University Professorial Lecture series.

Mick Roberts gave several seminars around the country on "The mathematics of plagues, epidemics and pandemics". Starting at Massey College of Science's seminar series, he then spoke at Auckland Mathematics colloquium and at Environmental Science and Research (ESR) at Upper Hutt.

Graeme Wake visited RMIT University in Melbourne in early June as a panel member of a review team for the School of Mathematical and Geospatial Sciences. That School is to host the ANZIAM Mathematics-in-Industry Study Group (after Wollongong) from 2010. He then moved onto Bangkok for a week as part of the exchange arrangement our Institute has with a group of Universities there for joint (exchange) PhD students in Industrial and Applied Mathematics. The week was hectic with 2 hour lectures every day. Graeme then moved onto England as part of his role as an External Member of the new Oxford Collaborative Centre for Applied Mathematics (OCCAM). This is a Global network centred at Oxford, funded by King Abdullah University of Science and Technology (KAUST) in Jeddah, Saudi Arabia. While in England he also gave lectures in the University of Leeds and chaired (and spoke at) the mini-symposium on "Mathematics in Agriculture and Health" at the 15th Biennial Conference of the European Consortium for Industrial and Applied Mathematics in London. He was able to see the Black Caps beat England at the one-day international cricket match at Lords, and then he moved onto Toronto, to visit the Fields Institute for a week. He was an invited contributor in the Centre for Mathematics in Medicine's programme in the "Mathematics in Oncology". Graeme arrived back just in time for the start of Semester 2, and just after the arrival of his and Lil's new grandchild (their fifth!!!-is this the record for NZMS members?) in Hamilton. Kyle is now 3 weeks old and doing well (congratulations Graeme!).

Robert McKibbin, Mick Roberts, Carlo Laing and Alona Ben-Tal attended the Applied Mathematics One-Day Meeting that was held at the University of Auckland on 9 June. Both Robert and Mick spoke at the meeting. Robert described "Where does it all go? - Some models for aerosol transport and deposits" while Mick considered "Seasonal influenza - it's worth having a shot".

Robert McKibbin then travelled to Europe to participate in two conferences following a couple of weeks annual leave in the UK. At the first conference, ECMI 2008, the biennial meeting of the European Consortium for Mathematics in Industry, held in London, UK, 30 June – 4 July, he presented the paper "Agricultural spray drift: Transport and trapping of evaporating liquid aerosols" co-authored by his PhD student Sharleen Harper. At the second, iEMSs 2008, the 4th Biennial Meeting of the International Environmental Modelling and Software Society, held in Barcelona, Spain, 7–10 July, he presented the paper "Mathematical modelling of aerosol transport and deposition: Analytic formulae for fast computation" in a session on "Modelling and simulation of dangerous phenomena, and innovative techniques for hazard evaluation, mapping, mitigation".

Carlo Laing visited the UK for three weeks during June-July to collaborate with Prof Steve Coombes, University of Nottingham. He gave seminars at Leeds and Heriot-Watt Universities, and gave two invited presentations at the Summer Workshop in Mathematical Medicine and Biology, Nottingham. While in Edinburgh he met Gabriel Lord to finalise publication details of their upcoming jointly-edited book "Stochastic Methods in Neuroscience."

In late July Beatrix Jones and Howard Ed-

wards both attended the International Society for Bayesian Analysis conference (ISBA2008) in Hamilton Island Australia. Beatrix presented a paper entitled "Bayesian parentage analysis using multiple imputation" and Howard a poster entitled "A survey of graduate courses in Bayesian statistics".

Amanda Elvin recently submitted her PhD thesis, "Pattern formation in a neural field model", supervised by Carlo Laing and Mick Roberts. In her thesis, Amanda studied the formation of different types of spatially localised patterns by applying both analytical and numerical techniques to a partial integro-differential equation. Following the submission of her thesis, Amanda is now a Postdoctoral Research Fellow with James Sneyd at Auckland University, modelling airway smooth muscle.

At the end of July we bade farewell to Tasos Tsoularis, who has moved to a position in the UK after eight years at Massey.

Congratulations ... Winston Sweatman won the "best poster" at the 15th Biennial Conference of the European Consortium for Mathematics in Industry in London 30th June to 4th July 2008 His poster entitled "A model for crop spray adhesion, bounce and shatter at a leaf surface" was coauthored with G. Mercer from ADFA and Alison Forster from Plant Protection Chemistry, Rotorua.

Marie Fitch received her Masters in Applied Statistics with Distinction (supervised by Beatrix Jones).

Alona Ben-Tal received the IIMS Teaching Award for 2008. The award comes with a certificate from the Institute and $1000 to acknowledge exceptional standards of lecturing and teaching achieved on an on-going basis. Two other IIMS staff members from the Information Technology group received the award this year. Alona continues a fine tradition of the math and stats groups. Claire Jordan and Marie Fitch received the award in 2007, Carlo Laing in 2006, Yow-Tzong Yeh in 2005 and Shaun Cooper in 2004.

Visitors: Dr Chris Volinsky from AT&T Research Labs Florham Park, New Jersey, is currently visiting the Statistics and Information Technology groups at IIMS. During his period here he will deliver some lectures on two of the Institute's block mode papers in statistics, give seminars and explore research interactions with the Institute's staff.

Dr Glenn Fulford of Queensland University of Technology visited Mick Roberts for a week in July.

Seminars:

Gregory Derfel, Ben-Gurion University, Israel, "Functional and Functional-Differential Equations with Rescaling and their Applications".

Dr. Brian Carpenter, University of Auckland, "The Internet: Where did it come from, Why did it succeed and Where is it going?"

Dr Salilesh Mukhopadhyay, CEO Feasible Solution LLC, USA, "Deterministic versus Stochastic Models in Environmental Pollution".

Dr Chris Volinsky , AT&T Research Labs Florham Park, USA, "Recommender systems for fun and profit".

Alona Ben-Tal

UNIVERSITY OF OTAGO

DEPARTMENT OF MATHEMATICS AND STATISTICS

Our new Professor of Applied Mathematics, Jörg Frauendiener, has had a busy time over the last few months. In May he visited Rod Gover at the Department of Mathematics, The University of Auckland and gave a talk on the Constrained Equations in General Relativity. Also in May Jörg visited David Wiltshire at the Physics Dept at University of Canterbury and gave a talk on gravitational physics. In June he visited Robert McLaughlan at Massey University and gave a talk entitled Compatible Discretisations. Then in July he travelled to Melbourne where he was a plenary speaker at the Australian Mathematical Sciences Institute Workshop and spoke on Relativistic Elasticity.

Robert Aldred was invited to the 21st Cumberland Conference on Combinatorics, Graph Theory and Computing in Vanderbilt University from 13–23 May where he was asked to speak in honour of Prof. Mike Plummer's 70th birthday. Mike has been a long-time collaborator of Robert's. They have worked together on many aspects of matching extension.

Several of the statisticians in the Department (Richard Barker, Claire Cameron, Peter Dillingham, David Fletcher and Chris Fonnesbeck) made their way to St Andrews, UK, to attend the International Statistical Ecology Conference in July. Richard Barker took the long route through the United States and Europe, catching up with former PhD student Matt Schofield now on a post-doc at Columbia University, USA, and then through Montpellier, France, where he spent time with Jean-Dominique Lebreton. David Fletcher took the occasion to celebrate his recent wedding with relatives in Switzerland and the UK, before meeting up with Chris Fonnesbeck, Peter Dillingham and last year's William Evans Fellow, Mike Conroy, for a three-day tour of Islay, where seven of the world's best whiskies are made: they carried out an

intensive sampling programme and came away with some interesting results...

As well as attending the ISEC conference in St Andrews, Scotland, Claire Cameron (PhD student in Statistics) also gave a talk at the IBC in Dublin. Claire commented, "It was a great opportunity to meet up with people that I hadn't caught up with for a long time and to see a little bit of Scotland and Ireland. It was also inspiring to see leaders in the areas I research in presenting their work. I went to a talk by the famous (in Statistics) Sir David Cox, where many photos were taken and I learned more about William Sealy Gosset (aka student) on the 100th anniversary of the publication of the first paper on the t distribution."

Naomi Ingram recently travelled to Australia and Mexico to present the findings of her Mathematics Education PhD. Naomi reports, "During my PhD I have been to three conferences of the Mathematics Education Research Group of Australasia (MERGA). This has enabled me to present and receive feedback on my developing PhD in a supportive environment and, more importantly, to foster relationships with researchers working in my area. During the conference this year, which was held in Brisbane, I was pleased to receive a MERGA Early Career Award for the outstanding paper and presentation.

"With other members of the department, including my supervisors Derek Holton and Tamsin Meaney, I then travelled to Monterrey in Mexico for the International Congress of Mathematics Education (ICME). This large and multicultural conference alerted me to international issues of equity and quality relating to mathematics education and demonstrated how language issues can be a barrier to success in research and a source of inequity.

"My travels were fully funded by much appreciated contributions from the Department of Mathematics and Statistics, the Division of Sciences (University of Otago), Education New Zealand, and the Otago Branch of the New Zealand Federation of Graduate Women."

Also at ICME11 Derek Holton chaired a Survey Team on the retention and recruitment of students in undergraduate mathematics courses. This work has led to a special issue of the International Journal on Mathematical Education in Science and Technology which Derek will edit. See Derek's article on Mayans and pyramids later in this section.

John Harraway was also at ICME in Monterrey, Mexico and presented a paper entitled "Using real data in classrooms — evaluating its effectiveness" with Prof. Sharleen Forbes (Statistics NZ and Victoria University). The paper is part of the Study Group on Research and Development in Teaching and Learning of Statistics.

Luke Bennetts and Gareth Vaughan (Postdoctoral Fellows) travelled recently to Vancouver, Canada, with Vernon Squire, for the International Offshore and Polar Engineering Conference. The conference was well attended by scientists from a broad range of disciplines, both academic and industrial, researching current and topical issues. The weather was great and the days long, providing plenty of opportunity to explore the city.

The Department congratulates Mihály Kovács (known as Misi) who got married in December in the couple's native country, Hungary. Misi just happened to be on leave working with Dr Stig Larsson at Chalmers University in Gothenberg in Sweden during this time. We are glad to have them both back in Dunedin again now.

Science Festival was held on 5–6 July. John Shanks, Dennis McCaughan and Greg Trounson produced some interactive models involving gears, wheels and pulleys, around the theme "Gear up for Maths". The public supported it well so we hope to have sparked some maths curiosity in young people.

Visitors

Dr Victor C Zinner, Yukawa Institute in Kyoto, Japan, visited Jörg Frauendiener to discuss joint projects and gave a seminar on topological phase transitions in brane black hole systems. Florian Beyer, from KTH Stockholm, Sweden, gave a seminar on the strong cosmic censorship conjecture in general relativity and worked with Prof. Jörg Frauendiener.

Prof. Peter Cameron from Queen Mary, University of London, UK, visited the Department in April as part of his Forder Lecturer's tour. The visit was very successful with excellent talks and a very welcome opportunity to work with Peter and discuss various aspects of the mathematical world. Long may the Forder Lecturer be supported by the LMS.

István Faragó, the Vice-Director of the Mathematics Institute, Eötvös Loránd University, Budapest, Hungary after attending the GLADE'08 conference in Auckland, spent almost four weeks as a guest researcher at the Department and also gave a seminar on operator splitting methods.

Prof. Helen MacGillivray, Queensland University of Technology, spent three days in Dunedin presenting a seminar and collaborating with John Harraway and John Shanks on planning for ICOTS8 in Slovenia in 2010.

Seminars

Dr Mike Paulin (Department of Zoology), "Reinventing the Wheel: Principles of Animal Location"

Dr Christopher J Fonnesbeck "If a Manatee Surfaces in the Ocean and Nobody Is There to See It, Does it Get Counted?"

Prof. Peter Cameron, Forder Lecturer (Queen Mary, University of London, UK), "Sudoku, mathematics and statistics"

Prof. Peter Cameron, Forder Lecturer (Queen Mary, University of London, UK), "Scenes from mathematical life"

Britta Dorn (University of Tübingen, Germany), "Asymptotic periodicity of flows in infinite networks"

Murray Efford (Department of Zoology), "Developments in spatially explicit capture-recapture"

Dr Gerrard Liddell, "Automating Mathematics"

Jose A. Garcia (Department of Preventive and Social Medicine), "The RNA World Scenario in the Context of Mathematical and Statistical Analysis of DNA and Protein Sequences"

Dr Geoff Bascand (Chief Executive & Government Statistician, Statistics New Zealand), "Measuring New Zealand's Progress: An Integrated Approach to Official Statistics"

Prof. Jörg Frauendiener, "Water waves, black holes and Riemann surfaces"

Peter Dillingham & James Robinson (Department of Anthropology, Gender and Sociology), "Bayesian models in archeology: Settlement of Tawhiti Rahi"

Colin Fox (Department of Physics), "Semi-analytic spectral methods and sound transmission in timber floors"

Prof. Geoff Jones (Institute of Fundamental Sciences, Massey University), "Methods and applications of statistical calibration using longitudinal data"

Ross Vennell (Marine Science), "Divergence Free Spatial Interpolation of Large Sparse Velocity Data Sets"

Prof. Helen MacGillivray (Queensland University of Technology), "Developing probabilistic statistical thinking"

Statistics Honours Presentations

Jimmy Zeng, "Statistical methods for luminescence lifetime estimation"

Dorothee Hodapp, "Estimation of abundance and impacts on the bottlenose dolphin population in Doubtful Sound"

Ella Josua, "Maori population stratification in the genetic study of gout"

Philippa Smale, "Yellow eyed penguin population development"

Bram Evans, "Special Relativity & Quantum Mechanics"

Doug Mackie (Department of Chemistry), "110% confidence tricks: The misuse of statistics in the "debate" about climate change"

Claire Cameron, "Open Population Capture-Recapture Models and Diabetes in Otago — the Continuing Saga"

William Probert (Spatial Ecology Laboratory, University of Queensland), "Management for Conservation: Controlling an Emergent Disease"

Florian Beyer (Max-Planck-Institute), "The strong cosmic censorship conjecture in general relativity"

David Fletcher, "Why Most Weighted Regressions Are Wrong"

John Clark, "Rectangular invertible matrices"

Austina Clark, "Modelling count and growth data with many zeros"

István Faragó (Eötvös Loránd University, Budapest, Hungary), "Operator Splitting Methods and Their Applications"

Lenette Grant

Mayans and Pyramids

You should read this piece with suspicion. Like a good reporter I haven't checked my sources and I took no notes while I was interviewing suspects. In addition most of the information was received while I was standing in the sun in 36 plus degree heat and who knows what percentage humidity. So you should just read this as a good numerological story that might have some truth in it.

I went to the ICME 11 meeting in Monterrey, Mexico last month and was lucky enough to be able to spend a few days in the Mexican state of Yucatan

afterwards. As you know, the Yucatan is famous for Mayans and pyramids (not to mention some pretty colourful birds but that's another story). So my wife and I duly went to Uxmal and Chichen Itza. Thanks to restoration in both places, I'm not sure if that is the politically correct thing to say, two beautiful pyramids can be seen one in each location. I'll just say a bit about the Mayans and the pyramid at Chichen Itza.

I'll spare you the human sacrifices and the eating of hearts, though that's always good for an after dinner conversation, and tell you about the numerology. But where to start? Well, look at your hands. There are three bones making up each finger and two for each thumb. On two hands that makes a total of 28. And 28 is the number of days it takes for the moon to do its thing as well as the length of the menstrual cycle. So that clearly makes the Moon the female god. In fact 7 goes into 28 and is the number of days in the week.

At the same time the Mayans were intrigued by the number 13. After all there are 13 weeks in each quarter of a year or season. Since 7 x 13 = 91 there are 91 steps on the north face of the Chichen Itza pyramid (count them for yourself). But there are four faces to the pyramid and 4 x 91 = 364, which is the number of days in the year if you are prepared to add one more for a day of rest, and they were. So you can see that 7 and 13 were important numbers for the Mayans.

It turns out that the Mayans were divided into the ruling class and the workers and the ruling class kept the secret of all of these numbers. The power of the ruling classes came from their facility with these numbers and their control over the calendar. After all the pyramids weren't places to bury the ruling classes but were astronomical objects like Stonehenge. Imagine being a plebe and being called to the pyramid on a certain day and being addressed by the supreme ruling classer and when he raised his arms aloft, having the sun god shine his light from behind the ruler onto the gathered plebes. Wouldn't you be overcome? This would be followed by the shadow of a snake making its way down the 91 steps. Pretty impressive eh? I'd be loyal for a few more weeks.

It does seem strange then that when the Spaniards came they managed to overthrow the Mayans in two years. Given that the Mayans completely outnumbered the 100 or so Spaniards that happened to be around you have to say that knowing about numbers and related things isn't sufficient to last for ever. And maybe there's a moral there for us all.

Derek Holton

UNIVERSITY OF WAIKATO

DEPARTMENT OF MATHEMATICS

Tim Stokes is now the new Chairperson of Department after Ernie Kalnins stepped down at the end of June. Tim's term will be for six months and a successor will be sought towards the end of the year.

Replacements for Alfred Sneyd and Rua Murray have now been appointed. One of the new staff members is Nick Cavenagh who is currently a Research Fellow at Monash University. His research interests are in combinatorics and graph theory. The other new staff member is Yuri Litvinenko who is currently a research assistant professor at the University of New Hampshire. His research interests are in theoretical space plasma physics. Yuri is already known to the department as he has been a research collaborator with Ian Craig and others. Both of these two new staff members are expected to arrive some time in November.

In mid-July, a function was held to confer the title of Honorary Fellow of the University of Waikato on Alfred. Quite a number of friends and colleagues of Alfred were present at this event. The citation was read by the Vice-Chancellor and the fellowship was conferred by the Chancellor.

We congratulate Jethro van Ekeren, a current BSc(Hons) student, on the award of a Fulbright-MoRST Graduate Award. He will soon be taking up this award for study towards a PhD in representation theory at MIT.

Sean Oughton is on study leave in the second half of the year. Most of the time will be spent in Hamilton, but he will be in the US from early October until the end of November. His plans include conferences in New Mexico and Texas as well as working with his collaborators at the University of Delaware.

Stephen Joe attended the Eighth International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing held in Montreal in July. While there, he was able to catch up with two former PhD students. He presented a talk titled "Sobol′ sequences with improved two-dimensional projections". Stephen is still the Acting Dean of the School of Computing and Mathematical Sciences, but hopes to be relieved of his duties in the not too distant future.

Seminars

J. van Ekeren, "The Lamb shift".

P. Cameron (Queen Mary, University of London), "The random graph".

P. Cameron (Queen Mary, University of London), "Sudoku, mathematics, and statistics".

F. Bonnefoy (École Centrale de Nantes), "Higher order spectral methods applied to nonlinear ocean waves".

Stephen Joe

VICTORIA UNIVERSITY OF WELLINGTON

SCHOOL OF MATHEMATICS, STATISTICS AND COMPUTER SCIENCE, *Te Kura Tatau*

First up from Victoria is some exciting news concerning quite a few new arrivals, plus their mums and dads. That's new children of existing VUW staff, rather than new staff – but maybe that type of succession planning for staff could be the way to go? Anyway, as mentioned in Newsletter 102, our School Manager Ginny Whatarau and her husband Rick celebrated the happy arrival of their daughter, Janayah, on 19 March 2008. Ginny was on parental leave until mid July, but she is now back managing us all again, very efficiently. Ginny says that Janayah likes to know what's going on, so sometimes she checks up on her mum two or three times a night. Consequently Ginny is often at work pretty early at the moment. In Ginny's absence over the last four months, Rowan McCaffery did an excellent job as the acting School Manager; thanks Rowan!

Other parts of the School obviously decided that they needed some new arrivals too, so Duncan McEwan and his partner Vic happily obliged with the birth of their son Ben on Wednesday 2 July at about 4pm. Duncan's parental leave has meant the rest of the Programmers are keeping busy, while Statistics and Operations Research (in particular) were delighted to learn of the arrival of Mark Johnston's new son Hamish. He was born on Sunday 27 July at 5:30pm, weighing in at 4.3kg (that is 9 pounds 8 ounces) and 54cm long. He'd kept his mum, Emily, and dad (plus the rest of us!) waiting for about a week and a half past his due date, so the fact he is quite a big boy isn't too surprising. Hamish spent the first 24 hours in ICU having a few problems with his breathing but he is fine now, as are his mum and dad. The accompanying photo, taken on his first day, shows Hamish sticking his tongue out (just a little bit).

Hamish Johnston

Mathematics

Peter Donelan attended the 11th international symposium on Advances in Robot Kinematics in Batz-sur-Mer, France, in June. He presented a paper on robot singularities and co-authored another on Euclidean invariants and a new syzygy. Peter's online database of research in Singularities of Robot Kinematics

homepages.mcs.vuw.ac.nz/∼donelan/cgi−bin/rs/main

constructed by graduate student Jeffrey Azzato, has now been running for six months and was recognised as a valuable research tool by participants at the meeting. The database now contains close to 1,000 items by around 900 researchers.

Rod Downey has a new graduate student, Andrew Fitzgerald, who is working on algorithmic randomness and genericity. Rod also has a new postdoc, Laurent Bienvenu, who received his PhD from Marseilles. Laurent joins Rod's other current postdoc, George Barmpalias, who will be at VUW until mid 2009. Rod is currently enjoying some of the research time that his two-year James Cook Fellowship gives him. The rest of us will be happy to let Rod do some guest lecturing, if he starts missing teaching too much...

John Harper will be presenting a poster "Electrophoresis of bubbles with free surfaces" at the International Congress of Theoretical and Applied Mechanics in Adelaide in August, and giving seminars on the same topic at Victoria University of Wellington beforehand (5 August) and at the University of Limerick, Ireland afterwards.

Mark McGuinness is revelling in his new-found freedom, having passed on the mantle of Editor of this Newsletter to Alex James. Alex has responded magnificently to the task, and Mark is pleased the Editorship is in such capable hands. Mark also is very grateful to the many correspondents and contributors over the past few years, who have kept the Newsletter vital and relevant.

Mark spent a few weeks midyear visiting the Mathematics Applications Consortium for Science and Industry (MACSI), University of Limerick, and plans to be at MACSI for most of next year on Research and Study Leave, accompanied by his wife Sandra, but leaving behind their three university-plus-age children this time. MACSI are developing a lively programme of engagement with Irish and European industry in an extended workshop style of operation. By the time you read this, Mark will also have attended the Fields-MITACS Industrial Problem-Solving Workshop to be held August 11-15 at the Fields Institute in Toronto, by invitation. He is still waiting for word from the Korea Advanced Institute of Science and Technology, as to whether the Foreign Team Professorship arrangement with the Applied Mathematics group there is to continue or not. This Foreign Team includes kiwis Graeme Wake and Bruce van Brunt, and initially included John Donaldson, who is from the University of Tasmania in Hobart and is also the father of the Crown Princess of Denmark.

Statistics and Operations Research

Richard Arnold was sponsored by the Ministry of Health to attend the scientific meeting of Novartis vaccines in Siena, to present on the effectiveness of the Meningococcal B vaccination programme in New Zealand. Richard was also on the organising committee of the International Society for Bayesian Analysis Biennial World Meeting, which took place in Australia for the first time this year. The conference, which Richard attended on Hamilton Island from 21–25 July, was a showcase for both Australian and New Zealand research in Bayesian methods and applications, along with researchers from all over the world.

Stefanka Chukova participated in two conferences in Bulgaria in June, both on the Black Sea coast. The first one, in Informing Science (IS) and Information Technology Education, was held in Varna; the second, the XIII International Summer Conference on Probability and Statistics, was held in Sozopol. In March, Stefanka and her husband David walked from Waikanae (on the Kapiti coast) to downtown Wellington in three consecutive weekends. The total distance of their trip accumulated to more than 100km! They are planning a walking trip in Nepal at the end of the year.

Estate Khmaladze hosted Valerian Wrobel, from Ecole Polytechnique, for a three month internship from May to July. Valerian was working on "Khmaladze transformations for linear hypotheses", and on 30 July he gave us a seminar on that topic before he returned to France. Estate's two current PhD students, Giorgi Kvizhinadze and Haizhen Wu, have had a joint talk accepted at a forthcoming conference, also in France. The topic of their current research, which is joint with Estate, is "The diversity of opinions in opinion polls and related topics". Estate says that, surprisingly, the topic turns out to be intimately connected with the difficult theory of large deviations and contiguity of probability measures. Estate also mentions that he has recently discovered a very good Pinot Noir from Tohu Wines, but he wishes it wasn't quite so expensive!

Ivy Liu took over from Stefanka Chukova as the Programme Director for Statistics and Operations Research in March 2008. Stefanka had been the Programme Director since July 2005, so we're all very grateful to her for directing us so well for nearly three years! We're also really grateful to Ivy for taking on the job now.

Shirley Pledger spent June on a research visit to the University of Kent at Canterbury, England. In July, Shirley was an invited speaker at the International Statistical Ecology Conference in St Andrews, Scotland and then she attended the International Biometrics Conference in Dublin, Ireland. Having seen a fair bit of the British Isles, Shirley is now back with us in Wellington.

Donald Nield

Quite a few years ago someone wrote a short spoof article for the NZMS Newsletter in which there was reference to the famous, but mythical, New Zealand mathematician Fred Daggovich who was said to have been born in Dargaville. I am afraid that I do not have the details. However, it is a great pleasure to write about a real and famous New Zealand mathematician who really was born in Dargaville, or more precisely Mangawhare, on the outskirts of Dargaville just where the main road to Waipoua leaves the river, in 1935.

Don's secondary education in the late 1940s and early 1950s at Dargaville High School culminated in his winning sixth place in the Universities Entrance Scholarship examination, including top in mathematics, and a Junior Scholarship. He moved south to Auckland University College, then part of the University of New Zealand, where he graduated BSc in 1956 and MSc with First Class Honours in Mathematics in 1957. He was Senior Scholar in Physics, Sir George Grey Scholar and Post Graduate Scholar in Science. Fortunately for us he kept with Mathematics but, as we shall see, the depth of his Physics influenced his mathematical career.

Don told me of a memory during the time when he was an honours student at Auckland. That was the time of transition from Professor H G Forder, who was Professor of Mathematics from 1934 to 1956, to Professor F Chong, who was Professor from 1956 to 1965 before moving to Macquarie University in Sydney. At a retirement function for Professor Forder he told a story against himself. His arrival as a fresh Professor in his mid-forties was of interest to the local media who duly sent a photographer to photograph the then retiring Professor H W Segar with the new Professor. At the end of the photo session the photographer then approached the two Professors and asked "Which of you is the retiring Professor?"

In 1957 Don headed off for his first OE, completing Honours in Parts II and III of the Mathematics Tripos at St Johns College, Cambridge, and graduating BA in 1959, with an MA in 1963. On his return to New Zealand in 1959 Don worked at the Naval Research Laboratory in Auckland, researching acoustic propagation in the sea. Lieutenant Nield left the Navy in 1962 to begin his long association with the University as a staff member. From my perspective the timing was perfect: readily at hand I have in my office a copy of notes from Stage III Pure Mathematics in 1962. In my late teens handwriting they are headed "Calculus Mr Nield" and cover a broad range of multivariable differential and integral calculus and end up with a discussion of Gamma and Beta functions. Thanks for those lectures, Don.

Promoted from Lecturer to Senior Lecturer in 1965, Don completed his PhD in 1967 (the first in Mathematics from the University of Auckland, though Frank Haight had completed a PhD in the study of traffic flows a decade earlier at the then Auckland University College). He was promoted to Associate Professor in 1972. In 1986, as part of its "rationalisation" of the teaching of Mechanics, the University asked Don to transfer to the Department of Theoretical and Applied Mechanics, now the Department of Engineering Science, from which Don officially retired in 1999. Don continued to teach part time until the end of 2006 and he continues as an Honorary Associate Professor in the Department of Engineering Science. Don holds the record for teaching Mathematics at the University, 44 years, a year ahead of his PhD supervisor the late Professor Cecil Segedin.

Later visits overseas have been associated with a range of visiting appointments: Assistant Geophysicist in the Institute of Geophysics and Planetary Physics, University of California, San Diego; Visiting Member of the Institute for Fluid Dynamics and Applied Mathematics, University of Maryland; Visiting Associate Professor in the Department of Aerospace Engineering and Mechanics, University of Minnesota; Visiting Scholar and Professor at Duke University. In December 2005 he gave the G.I. Taylor Memorial Lecture at the Golden Jubilee Congress of the Indian Society of Theoretical and Applied Mechanics.

He has taught a range of courses at all levels in the University specialising, of course, in topics related to applications of mathematics especially to mechanics, fluid dynamics and mathematical physics in general. He has also contributed to his share of University administration: we served together on a departmental committee in the early 1970s and for the last 16 years, even though he has retired, he has been a member of the Engineering Faculty Library Committee. He served on the

executives of the Auckland Mathematical Association and the Auckland University Lecturers Association and was Branch Secretary of the Association of University Teachers. A foundation member of the NZMS he has also been a frequent participant in the Mathematical Colloquia. Professionally he has made significant contributions, such as as a member of the Editorial Boards of the journals Transport in Porous Media and Journal of Porous Media.

In the community Don has made a number of contributions, including service as Secretary of the Board of Managers of the Somervell Presbyterian Church, the executive of the Auckland Presbyterian Harriers Club and a member of his local School Committee.

Don's research may be broadly described as being in Fluid Dynamics and he has published over 150 research papers on mathematics, physics, geophysics and engineering. His first paper, "Surface tension and buoyancy effects in cellular convection," appeared in the Journal of Fluid Mechanics in 1964 and has attracted almost 400 citations. In this paper Don uses a Fourier series method to solve an eigenvalue problem related to convection in a layer of fluid heated from below, when surface tension variations with temperature and buoyancy act together to cause the instability. At least 40 other publications have received at least 10 citations, with two further papers attracting well over 100. Don's h-index[2] is 21.

One impressive feature of Don's research is that he has not slowed down since retirement. On the contrary, when he retired Don had 83 publications but now the number is up to 155 and there is no let-up. In January this year he submitted three papers, and that was after submitting four in the last three months of 2007.

With a co-author, Adrian Bejan, Don has published a book "Convection in porous media," Springer. The Mathematical Reviews review of the second edition begins "This is the second edition of a well-known book on convection in porous media." The reviewer is right to start out this way: the book has received over 1000 citations. The third edition of the book was published in 2006.

Don's writing has not been confined to fluid mechanics and related fields. 25 years ago he wrote a very readable centenary history of Mathematics at the University of Auckland.

Apart from his Mathematics, Don has kept physically active. In the earlier days he did lots of tramping in both the North and South Islands as well as overseas in Austria and Switzerland. Immediately before the first Australasian Mathematics Convention in Christchurch we planned a tramp at Arthurs Pass but the weather had been so bad that both road and rail links from Christchurch were broken so we wandered around the tip of Banks Peninsula instead. He was also a keen runner. Many are the lunch times when I have run around the streets of Auckland with Don and some other colleagues. A favourite of mine was along the sewer pipe across Hobson Bay, alas now closed to such activities because the authorities are afraid that a runner will break through the pipe into who-knows-what below. Sometimes Don would goad me into longer runs and despite his extra 7 years it was always a challenge to keep up with him yet he never complained if I lagged. I enjoyed those hours of running and talking. It is too bad that the knees eventually cry out "Hold, enough." Unlike me, Don ran a dozen marathons, best time 3.05 at age 46. He also entered the annual run up the steps of the Sky Tower, coming in first for his age group.

Don has maintained his interest in religion, having completed a Bachelor of Divinity degree from the University of Otago. One of his retirement hobbies is writing articles on the interface between religion and science. One article soon to appear discusses Gödel's theorems.

For 47 years (and counting!) Don has been happily married to Rachel (nee Thompson), whom he met at the University Tramping Club. They have three children and six grandchildren.

David Gauld

[2] $http://en.wikipedia.org/wiki/H-index$

local news continued...

Tony Vignaux is celebrating 40 years at Victoria University of Wellington. He became foundation Professor of Operations Research in January 1968, moving office down one floor in the Rankine Brown building from the DSIR applied mathematics division. Some things have changed over the last 40 years — from the Elliott 503 to the Dell Pentium 4 on his desktop. Some things have not changed — Tony always wears a tie when teaching. Highlights of his 40 years include being awarded a prize as one of Victoria's top 100 lecturers of all time, serving as president of the OR Society (and the NZ Statistical Association too), and sabbatical visits to Hawaii, Berkeley, Warwick and Oxford. Tony observes that a good trend in OR is the development of free and open source software (possibly a shameless plug for his SimPy discrete-event simulation package in Python, see *http://simpy.sourceforge.net/*) and a bad trend is that we now seem to teach OR techniques rather than modelling real problems. However, Tony feels that he enjoys OR a lot more now that he has retired and does not have to do any university administration.

Seminars

Rob McBrearty (VicLink), and Mark Hargreaves (AJ Park), "Intellectual Property and Commercialisation"

Chris Dangerfield (SMSCS Portfolio Manager, VUW), "Funding Opportunities"

Nokuthaba Sibanda (VUW), "Bayesian QTL mapping using reversible jump MCMC"

Nicholas Horton (Smith College, Northampton MA, USA), "Principled data combination of multiple source reports using manifest and latent variable regression models"

Craig McLeod (Orbit Systems), "Vehicle Load Building: Evolving Solution Techniques"

Adam Day (VUW), "Investigating the Difference between Monotonic Complexity and A Priori Complexity"

Helen Broom , "From Solovay to Schnorr: A combinatorial connection between set theory and computability"

Kourosh Neshatian (VUW), "Genetic Programming for Feature Manipulation"

Adam Day (VUW), "Investigating the Difference between Monotonic Complexity and A Priori Complexity (part II)"

Min Zhang (ANU), "Space-Time-Frequency Linear Block Coding for MIMO-OFDM in Next Generation Wireless System"

Brian Carpenter (University of Auckland), "IET Prestige Lecture 2008 - The Internet: Where did it come from and where is it going?"

Pra (D.N.P.) Murthy (University of Queensland), "Warranty Modelling, Analysis and Optimisation"

Laurent Bienvenu (VUW), "Computable approximations of Kolmogorov complexity"

Sergey Ajiev (University of New South Wales), "Counterparts of the Jacobi identities and the extendability of the Hoelder maps between function and sequence spaces"

Alex Novikov (University of Technology, Sydney), "First passage problems for AR(1) and Ornstein-Uhlenbeck processes"

Valérian Wrobel (Ecole Polytechnique, France), "Khmaladze martingale transforms for linear models"

John Haywood

WELLINGTON STATISTICS GROUP

Wellington Statistics Group News

The Wellington Statistics Group (WSG), a local group of the New Zealand Statistical Association (NZSA), continues to meet regularly. The following are recent talks given to WSG:

3 June 2008, Pra Murthy, University of Queensland, Australia. "Warranty: An Introduction."

23 Apr 2008, Nicholas Horton, Smith College, Northampton MA, USA. "What your physician should know about statistics but perhaps doesn't: The implications of the increasing sophistication of statistical methods in medical research."

3 Apr 2008, Ray Chambers, University of Wollongong, Australia and NZSA Visiting Lecturer for 2008. "Measurement Error in Auxiliary Information."

We also have a planned talk coming up in October 2008 by Jim Ridgway.

Further details (abstracts, etc) of these and all previous talks can be found on the NZSA Local Groups web page

(*http://nzsa.rsnz.org/local_groups.shtml*)

This web page also contains contact details for WSG, names of sponsors, and details of forthcoming talks. In addition, a link can be found there so that people can add or delete their names from the mailing list.

If anybody is visiting Wellington at a time coinciding with a talk, then you are most welcome to attend. No registration is required. We are also keen to receive offers of talks from people who have something they would like to present. Many individuals work in isolation from other statisticians and often have little opportunity to discuss their work with others. WSG aims to provide a forum for such people too.

As an illustration of the impression that we hope WSG makes, here's some feedback from Nick Horton, who gave a WSG talk in April. Nick was briefly visiting me in Wellington during his Auckland-based sabbatical, and wrote, "I really enjoyed the chance to speak at Victoria and the WSG as well as interact with the attendees. I commend you for creating this umbrella for statisticians and statistically minded people." We were very pleased to host Nick, and we're glad he enjoyed the experience too.

We'd very much like to hear from anyone in the Wellington region who would be keen (OK, maybe just willing!) to take over the WSG treasurer's job from Alistair Gray, since Alistair has been doing that since 2001 and he definitely has earned himself a well-deserved rest.

Finally, we are grateful to all the WSG sponsors: Victoria University of Wellington, Statistics New Zealand, the Ministry of Social Development and Statistics Research Associates Ltd.

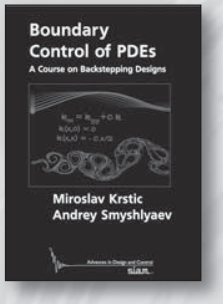
Dr John Haywood

New Titles in Applied Math from SIAM

www.siam.org/catalog

Boundary Control of PDEs: *A Course on Backstepping Designs*

Miroslav Krstic and Andrey Smyshlyaev



This concise and highly usable textbook presents an introduction to backstepping, an elegant new approach to boundary control of partial differential equations (PDEs). Backstepping provides mathematical tools for constructing coordinate transformations and boundary feedback laws for converting complex and unstable PDE systems into elementary, stable, and physically intuitive "target PDE systems" that are familiar to engineers and physicists.

2008 · x + 192 pages · Hardcover
ISBN 978-0-898716-50-4 · List Price $89.00
SIAM Member Price $62.30 · **Order Code DC16**

Numerical Methods for Evolutionary Differential Equations

Uri M. Ascher

"This book achieves the allegedly impossible: it blends informality and rigour, making scientific computing exciting and intellectually honest."

— Arieh Iserles, University of Cambridge.

This textbook develops, analyzes, and applies numerical methods for evolutionary, or time-dependent, differential problems. Both PDEs and ODEs are discussed from a unified viewpoint. The author emphasizes finite difference and finite volume methods, specifically their principled derivation, stability, accuracy, efficient implementation, and practical performance in various fields of science and engineering.

2008 · xii + 403 pages · Softcover
ISBN 978-0-898716-52-8 · List Price $79.00
SIAM Member Price $55.30 · **Order Code CS05**

Discontinuous Galerkin Methods for Solving Elliptic and Parabolic Equations: *Theory and Implementation*

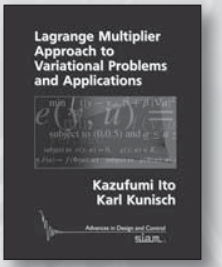
Béatrice Rivière

Discontinuous Galerkin (DG) methods for solving partial differential equations, developed in the late 1990s, have become popular among computational scientists. This book covers both theory and computation as it focuses on three primal DG methods—the symmetric interior penalty Galerkin, incomplete interior penalty Galerkin, and nonsymmetric interior penalty Galerkin–which are variations of interior penalty methods. The author provides basic tools for analysis and discusses coding issues.

2008 · xxii + 190 pages · Softcover
ISBN 978-0-898716-56-6 · List Price $55.00
SIAM Member Price $38.50 · **Order Code FR35**

Lagrange Multiplier Approach to Variational Problems and Applications

Kazufumi Ito and Karl Kunisch

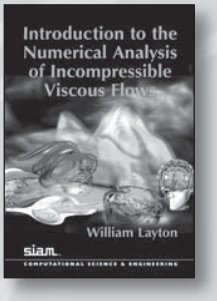


Lagrange multiplier theory provides a tool for the analysis of a general class of nonlinear variational problems and is the basis for developing efficient and powerful iterative methods for solving these problems. This comprehensive monograph analyzes Lagrange multiplier theory and shows its impact on the development of numerical algorithms for problems posed in a function space setting. The book is motivated by the idea that a full treatment of a variational problem in function spaces would not be complete without a discussion of infinite-dimensional analysis, proper discretization, and the relationship between the two.

2008 · xviii + 341 pages · Softcover
ISBN 978-0-898716-49-8 · List Price $99.00
SIAM Member Price $69.30 · **Order Code DC15**

Introduction to the Numerical Analysis of Incompressible Viscous Flows

William Layton



This book treats the numerical analysis of finite element computational fluid dynamics. Assuming minimal background, the text covers finite element methods; the derivation, behavior, analysis, and numerical analysis of Navier–Stokes equations; and turbulence and turbulence models used in simulations. Each chapter on theory is followed by a numerical analysis chapter that expands on the theory. The chapters contain numerous exercises.

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A Unified Approach to Boundary Value Problems

Athanassios S. Fokas

This book presents a new approach to analyzing initial-boundary value problems for integrable partial differential equations (PDEs) in two dimensions, a method that the author first introduced in 1997 and which is based on ideas of the inverse scattering transform. This method is unique in also yielding novel integral representations for the explicit solution of linear boundary value problems, which include such classical problems as the heat equation on a finite interval and the Helmholtz equation in the interior of an equilateral triangle.

2008 · xvi + 336 · Softcover
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8/08

OBITUARIES

Warwick Sawyer

Walter Warwick Sawyer was a mathematician and author who made a major contribution to mathematical education. He recently passed away in Canada, aged 97.

Sawyer was born in 1911 and won scholarships to Highgate School and St John's College, Cambridge. After becoming head of mathematics at Leicester College of Technology, he became interested in the applications of mathematics to industry, and developed a scheme in which apprentices learnt mathematics by handling physical objects. In 1943 he published his first and most successful book *Mathematician's Delight*, which has been in continuous publication since and has sold about 500,000 copies.

In 1948 he became the head of mathematics at the University of Ghana, and from 1951 to 1956 he lectured in Canterbury College, New Zealand. During the period 1957 to 1964, Sawyer became a loud voice criticising many aspects of mathematics education, and in 1965 was appointed Professor jointly to the Departments of Mathematics and Education in the University of Toronto. After retiring in 1976, he wrote his final book, *A First Look at Numerical Functional Analysis*.

Sawyer was very much concerned with the practical applications of mathematics. He considered that students taught mathematics without an appreciation of its application would have no more understanding of what they were learning than a machine. His love of mathematics is seen in the title of his first book, *Mathematician's Delight*, whose aim was to "dispel the fear of mathematics":

"Many people regard mathematicians as a race apart, possessed of almost supernatural powers. While this is very flattering for successful mathematicians, it is very bad for those who, for one reason or another, are attempting to learn the subject."

He considered that teachers should work with students' minds and talents, rather than force foreign concepts on them.

"Education consists in co-operating with what is already inside a child's mind... The best way to learn geometry is to follow the road which the human race originally followed: Do things, make things, notice things, arrange things, and only then reason about things."

Sawyer's understanding of how we learn mathematics, along with his practical approach, has meant that *Mathematician's Delight* is one of the most successful introductions to mathematics ever written. It tackles algebra, graphs, logarithms, trigonometry, calculus and imaginary numbers, all with real-life examples. Sawyer's overarching thesis is that the theory within mathematics is not as important as its real-life application: for example, the Pyramids were built on Euclidean principles three thousand years before Euclid formulated them.

An interesting recollection of Sawyer's explains how it dawned on him as a teacher early in his career that if he could communicate the purpose of mathematics, students would stay interested in his classes:

"In a class I was taking there was one boy who was much older than the rest. He clearly had no motive to work. I told him that, if he could produce for me, accurately to scale, drawings of the pieces of wood required to make a desk like the one he was sitting at, I would try to persuade the Headmaster to let him do woodwork during the mathematics hours — in the course of which, no doubt, he would learn something about measurement and numbers. Next day, he turned up with this task completed to perfection. This I have often found with pupils; it is not so much that they cannot do the work, as that they see no purpose in it." (*A European Education*). In *Mathematician's Delight* he compared learning mathematics without context to a deaf child learning to play the piano:

"Nearly every subject has a shadow, or imitation. It would, I suppose, be quite possible to teach a deaf and dumb child to play the piano. When it played a wrong note, it would see the frown of its teacher, and try again. But it would obviously have no idea of what it was doing, or why anyone should devote hours to such an extraordinary exercise. It would have learnt an imitation of music, and it would fear the piano exactly as most students fear what is supposed to be mathematics. What is true of music is also true of other subjects. One can learn imitation history — kings and dates, but not the slightest idea of the motives behind it all; imitation literature — stacks of notes on Shakespeare's phrases, and a complete destruction of the power to enjoy Shakespeare."

In his book, *A Concrete Approach to Abstract Algebra*, Sawyer explains how practical examples are the key setting up a mathematics course, and how, even if this takes longer, it is a better approach than simply stating "every axiom" as the student will be able to apply mathematics in other areas of life:

"In planning such a course, a professor must make a choice. His aim may be to produce a perfect mathematical work of art, having every axiom stated, every conclusion drawn with flawless logic, the whole syllabus covered. This sounds excellent, but in practice the result is often that the class does not have the faintest idea of what is going on. Certain axioms are stated. How are these axioms chosen? Why do we consider these axioms rather than others? What is the subject about? What is its purpose? If these questions are left unanswered, students feel frustrated. Even though they follow every individual deduction, they cannot think effectively about the subject. The framework is lacking; students do not know where the subject fits in, and this has a paralyzing effect on the mind.

"On the other hand, the professor may choose familiar topics as a starting point. The students collect material, work problems, observe regularities, frame hypotheses, discover and prove theorems for themselves. The work may not proceed so quickly; all topics may not be covered; the final outline may be jagged. But the student knows what he is doing and where he is going; he is secure in his mastery of the subject, strengthened in confidence of himself. He has had the experience of discovering mathematics. He no longer thinks of mathematics as static dogma learned by rote. He sees mathematics as something growing and developing, mathematical concepts as something continually revised and enriched in the light of new knowledge. The course may have covered a very limited region, but it should leave the student ready to explore further on his own."

His books include:

Mathematician's Delight (1943); *Prelude to Mathematics* (1955); *A Concrete Approach to Abstract Algebra* (1959); *What Is Calculus About?* (1961); *Introducing Mathematics* (1964); *Vision in Elementary Mathematics* (1964); *A Path to Modern Mathematics* (1966); *The Search for Pattern* (1970); *An Engineering Approach to Linear Algebra* (1972); *A First Look at Numerical Functional Analysis* (1978).

First appeared in Plus and republished with minor edits and permission. http://plus.maths.org.

FEATURES

The New Zealand Institute of Mathematics & its Applications (NZIMA)

This is a brief update on what's happening with the NZIMA. We have completed contracting for our next three years of CoRE funding, to mid-2011. This will allow a more limited amount of activity than previously, but still support a good range of things of benefit to New Zealand.

Two new thematic programmes got underway this year: one on 'Algorithms' (directed by Mike Atkinson (U Otago) and Charles Semple (U Canterbury)), and one on 'Conformal Geometry' (directed by Rod Gover (U Auckland) and Gaven Martin (Massey U)). We have also decided to provide partial support to two further programmes for the next three years: one on 'Energy, Wind and Water' (directed by Mike O'Sullivan and Gordon Mallinson (U Auckland)), and one in Mathematics Education (directed by Bill Barton (U Auckland)). The latter programme will investigate the conditions required for producing sufficiently mathematically qualified graduates in all fields, including the qualifications of secondary school maths teachers.

Graeme Wake (Massey U) completed his month-long Maclaurin Fellowship in February, and Eamonn O'Brien (U Auckland) is about to begin his. This year's Visiting Maclaurin Fellows are Professors Michael Eastwood (Adelaide), Edgar Knobloch (UC Berkeley) and Jan Saxl (Cambridge). We are also sponsoring a number of other visitors and conferences, including the 2nd NZ Maths and Stats Postgraduate Conference in November, and the 4th International Conference on Combinatorial Mathematics and Combinatorial Computing and the 7th Australia-New Zealand Mathematics Convention in December.

One of our main priorities is to continue support for the annual summer meetings (run through the NZMRI). The next one, on algorithmic information theory, computability and complexity, will be in January 2009 in Napier, and this will be followed by meetings on groups and representations (January 2010) and dynamical systems (January 2011).

For more details about these and other events, see the NZIMA's website *http : //www.nzima.org/* (and select 'Upcoming Conferences').

One of our biggest successes has been the initiation of the 'MathsReach' resource for schools - see http://www.mathsreach.org/. This is winning wide acclaim from students, teachers, parents and careers advisors, and even from mathematics teachers overseas. We welcome suggestions for further enhancing this valuable resource. *Marston Conder and Vaughan Jones (NZIMA Co-Directors)*

MISG2008: Mathematics and Statistics in Industry Study Group

MISG2008, the Mathematics and Statistics in Industry Study Group, was held at the University of Wollongong (UOW), from 28th January to 1st February 2008. The MISG2008 team comprised Prof. Tim Marchant (Director), Dr Maureen Edwards (Associate Director) and Ms Joell Hall (Administrator).

From left: Prof. Andrew Fowler, Universities of Limerick and Oxford; Dr Jane Sexton, GeoSciences Australia; Prof. Tim Marchant, Director MISG2008 and Dr Maureen Edwards, A/Director MISG2008

The event attracted 100 delegates, including twenty postgraduate students, who worked on seven industry projects. Five of these projects were submitted by Australian companies and two were from New Zealand. The disciplines of Applied Mathematics, Financial Mathematics and Statistics were all represented in the week's activities with many projects having an interdisciplinary flavour.

The invited speaker was Prof. Andrew Fowler, from the Universities of Limerick and Oxford. His plenary talk, titled "Freckles, Volcanoes and Rivers: Channelisation in the Industrial and Scientfic World", was well received by the audience. Thanks also to Prof. Jim Hill, from UOW and Dr Milorad Kovacevic, Statistics Canada, for their seminars during MISG week.

MISG2008 was opened by Prof. Lee Asthiemer, DVC-Research at Wollongong. Many thanks to Lee for attending the opening ceremony, which was held on the Australia Day public holiday. The industry project sponsored by Provisor and Food Science Australia, on the "Shelf life of wine", attracted significant media publicity, with an article appearing in the *Illawarra Mercury*. The photo below accompanied the *Illawarra Mercury* article and shows Tim, Geoff and Philip tackling the shelf life issue in a direct manner; by drinking the contents!

Due to the broad range of skills required to tackle modern industrial mathematics problems, many high-profile scientists from the Australian and NZ Statistics and Financial Mathematics communities attended MISG2008 as delegates or moderators. If the MISG meeting is to remain relevant and important in the coming years then this multi-disciplinary approach to industrial problem solving needs to continue, with participation at MISG from all the Mathematical Sciences.

Moderation of an MISG project is a challenging task involving problem solving, people management and working to a very tight deadline. Our thanks and gratitude go to the moderators of each of the MISG2008 projects. See our web-site *www.misg.math.uow.edu.au* for the industry project descriptions from MISG2008, the equation-free summaries of the projects and the project reports, as they become available.

Our website also provides details of MISG2009, to be held 27th Jan.–1st Feb. 2009 at UOW. Prof. Alistair Fitt, who is PVC-R at the University of Southampton has agreed to be the invited speaker for MISG2009. He is an European Study Group in Industry regular and an acknowledged expert on Industrial Mathematics. Another exciting development is that UOW is hosting the AMSI Summer School in Jan. 2009 and a course on Industrial Mathematics will be on offer.

It will be possible for postgraduate students to participate in MISG2009 as part of this AMSI Summer School course. We hope to see everybody at UOW for the 2009 event.

From left, A/Prof. Geoff Mercer, UNSW@ADFA and Provisor project moderator, Prof. Tim Marchant, Director MISG2008 and Mr Philip Giesbertz, Provisor Australia.

Tim Marchant and Maureen Edwards

How do I win the Aitken prize: what is looked for in student mathematics presentations?

Prizes are awarded to students for the best presentation at a variety of conferences. (There are even some awards aimed at the rest of us such as the Cherry Ripe prize at ANZIAM.) I have been involved in the judging of some of these awards. Students and colleagues have encouraged me to write this article to consider some aspects of a good mathematics presentation. I hope that the following thoughts will help any presenter although, unfortunately, even followed to the letter, they cannot be guaranteed to produce a prize-winning presentation.

I will focus on the Aitken prize which is awarded to the best contributed talk by a student at the annual New Zealand Mathematics Colloquium. There are no fixed criteria for this, although judges will usually consider a number of aspects of the presentations to help in their comparison whilst taking a holistic overview.

Who is the audience?

An audience at the New Zealand Mathematics Colloquium is likely to contain people from a wide range of mathematical backgrounds. You may have presented your work previously in another forum but before you re-use your talk think carefully. Is the audience the same?

Remember that the audience is there to hear what you have to say. They are hoping to enjoy the experience and possibly learn something. Be enthusiastic and show that you want to tell them about your work.

Don't assume too much prior knowledge

One danger for the speaker is to give a talk that assumes too much specialised knowledge and loses some members of the audience from the very start. This is a particular risk when there are special sessions focusing on specific areas of mathematics. It is fair enough to refer to earlier talks (or subsequent talks) but it is unreasonable to assume that all the audience have attended these or will have understood all that has been (or will be) said!

Do include some mathematics

If you are studying mathematics that can be related to the real world then this can present great opportunities for illustrations to enliven the presentation. However, a mathematics audience does expect some mathematics! It is usually not possible to go through all the details of a mathematical argument in a few minutes but it is desirable to show the general line of reasoning and key features. This may include governing equations or theorems; try especially to present novel ideas. These are the things that an audience will be really keen to hear (your thoughts may provide inspiration for them to think in new ways about their own mathematical research).

Indicate the context of the work

It is good to present the context of your work. What is the background to the work? Who has done what in the past? (People are often interested in the history of a subject or problem.) Where does the work fit in? Why is it important? You must have an idea of why you are spending three or four years researching this area so try to communicate some of this passion.

Mention your own work

Talks will differ in the amount of contextual material that needs to be given but even if the work is very specialised and needs a lot of background description, the audience will be interested in your own role. The speaker's own mathematical contribution can be an important aspect to consider when judging the

best presentation. You need to make it clear what you have done yourself. If you have only just started the work then you can still outline what you intend to do. If you have found some great results then say so and say why they are important.

Practise the talk

It can be helpful to talk through a presentation beforehand. By doing this the more awkward points in the presentation can be identified and focused upon. The timing can be adjusted to fit the appropriate time slot. However, do not try to memorise a talk word for word as it is difficult to do this without destroying the spontaneity that helps to enliven a presentation.

If you are able to show your presentation to other people they may make useful suggestions.

Concluding note

There is no single best way to make a presentation. There are usually a number of good ways to present material. Perhaps this is just as well for, if all our presentations were similar in style and format, life would be rather less interesting. Over the last few years I have seen many excellent student mathematics presentations from which there is much to learn. I hope to continue to see such presentations in the future!

Winston L. Sweatman

BOOK REVIEWS

Book review of "Arnold's Problems", Vladimir Arnold, Springer Berlin and Phasis Moscow, 2005.

Hilbert's thirteenth problem asks if every continuous function of several variables is a finite composition of functions of two variables. The Russian mathematician Vladimir Arnold shot to fame while still a teenager with his 1957 answer ("Yes.") that was the opposite of what had been expected. Today he is one of the most celebrated and interesting mathematicians in the world. He is the most-cited Russian scientist of all time (more than 20,000 citations), all the more remarkable considering that his main fields, classical mechanics and singularity theory, are not the most mainstream parts of mathematics. His mathematical monographs and texts, especially *Mathematical Methods of Classical Mechanics*, are widely admired for their geometric and topological approach, and, although not extremely technical, are still quite difficult to read as the demands on the reader increase rapidly. His general books and essays are also worth reading as he is a strong critic of many aspects of modern mathematics and modern education, and of conventional views of the history of mathematics — I remember enjoying *Huygens & Barrow, Newton & Hooke*, despite one reviewer, a historian of mathematics, describing it as "money for jam"—but I can't recommend his latest, *Yesterday and Long Ago*, a bizarre blend of memoir and historical pastiche written during a convalescence. Although, it might have been there that I read of Arnold's method for dealing with the common situation of being blocked in your research. You put your shorts on and go outside and ski for 60km (swimming across any rivers you might meet). During the ski, the solution to the problem will occur to you. Back in your office, it will almost always be the case that the solution will not hold up; however, by this time the blockage will have been broken and you will be on your way again.

So I was really looking forward to the book under review.

Arnold's Problems is a collection of research problems proposed by Arnold at his Moscow and Paris seminars from 1956 to 2003. The first part of the book (179pp.) consists of the 775 problems. (These can also be read on-line at `www.phasis.ru`.) The second part (457pp.) consists of commentaries provided by 59 different contributors, mostly participants in the seminars. It's an exhilarating prospect: the huge time span, the famous school, the unique point of view. Many topics that have since grown into large research fields appear here in problem form: on the second page, problem 1963–1: Is there true instability in multidimensional problems of perturbation theory where the invariant tori do not divide phase space? (Answer: yes; this is now known as Arnold diffusion.) Problem 1963–3: Are there bounded motions filling up a set of positive measure in the three body problem? (Answer: yes; these are the KAM (Kolmogorov–Arnold–Moser invariant tori.) Problem 1972–33: Prove that a symplectic diffeomorphism of a compact symplectic manifold M onto itself possesses at least as many fixed points as a smooth function on M has critical points, whenever this diffeomorphism is homologous to the identity. (This is the famous Arnold conjecture that changed the course of symplectic geometry and topology. The connection with critical points is that symplectic maps are locally given in terms of generating functions S by $p = \nabla S(q)$. Work of Floer, Hofer and many others led to an understanding of many cases by the mid-1990s.)

These three examples already illustrate the tone of the problems and the strength and weakness of the book. The problems are deep, broad, important, and difficult and many have changed the course of mathematics. Their statement is often cryptic and requires a good understanding of the relevant field even to grasp the immediate problem, let alone its context. For problems in fields that I have studied thoroughly, like the three above, I can see that there is a vast history and research programme behind each one. The drawback is that this renders reading just the problem statement irrelevant, and makes me suspect that with problems in other areas, I am missing nearly everything.

Many of the problems reflect Arnold's interest in Hamiltonian dynamics. Here is a sample of problems from a range of other areas that illustrate the flavour of the book.

Topology: 1970–14: Evaluate the fundamental group of the space of embeddings of a circle into a solid torus (the answer is a knot invariant!)

Dynamical systems: 1972–19: Are the structurally stable maps of $\mathbb{S}^1$ into itself dense?

Representation theory: 1972–8: Find "the most probable" representations of symmetry groups (i.e., describe their maximal-dimension components).

Singularity theory: 1986–8: Study the singularities of the apparent contours of convex bodies.

Projective geometry: 1994–17: Find all projective curves projectively equivalent to their duals. *The answer seems to be unknown even in* $\mathbb{R}P^2$.

Fluid mechanics: 1994–27: Is it true that the minimum dimension of an attractor of a Navier–Stokes system unboundedly increases as the viscosity diminishes?

Number theory: 2003–1: Let $T(n, a)$ be the least integer such that $a^T \equiv 1 \pmod{n}$, where a and n are relatively prime. It behaves very irregularly. Prove or disprove that the average growth rate of $T(n)$ is asymptotically $Cn/\log n$ as $n \to \infty$.

You can see that the commentaries are crucial to being able to understand the problems. The commentaries are very variable — some problems come with several pages of historical commentary, a guide to the progress that has been made, and in some cases more than a hundred references, while others come with just a reference to the original statement of the problem, and yet others come with nothing at all. It appears that the contributors have responded with very varying degrees of enthusiasm to the whole project, with Arnold commenting on 75 problems, Sevryuk (KAM theory) on 34, Vassiliev (topology & singularity theory) 33, and Khesin (symplectic geometry, diffeomorphism groups) on 25, with just a few from each of the 55 other contributors. The level demanded of the reader also varies widely, with some of the commentaries being (to me) just as opaque as the problems. Together this makes the commentaries an uneven reflection of the content of the problems. It was frustrating to read an interesting problem in an area relevant to me and then hunt it down in the commentary section only to find no commentary.

Perhaps some alternative arrangement of the material could have helped. Many problems or areas recur again and again. Hilbert's 16th problem, to determine the maximum number of limit cycles of a polynomial vector field in the plane, occurs first in 1958 and then repeatedly, in various weakenings and reformulations, until 1994. Unfortunately, there is no subject index (although there are some cross-references between the commentaries).

In the preface to the 1st edition, Arnold states that "There are two principal ways to formulate mathematical assertions: Russian and French. The *Russian way* is to choose *the most simple and specific* case (so that nobody could simplify the formulation preserving the main point). The *French way* is *to generalize the statement as far as nobody could generalize it further*." Yet in the preface to the 2nd edition, "Problems ... admitting a "yes–no" answer are of little value here. One should rather speak of wide-scope programs of explorations of new mathematical (and not only mathematical) continents, where reaching new peaks reveals new perspectives, and where a preconceived formulation of problems would substantially restrict the field of investigations...".

The "wide-scope" problems are perhaps the most interesting. They seem to be based on pretty strong hunches, analogies, or coincidences and many of them will bear fruit. Arnold's "trinities" (1997–9) are an example. "In addition to the pairs (an object, its complexification) in various mathematical theories, one often encounters triples of objects. The conjecture is that it is not a coincidence and all the triples are related by commutative diagrams." Examples are $(\mathbb{R}, \mathbb{C}, \mathbb{H})$, (E_6, E_7, E_8), $(\mathbb{S}^1, \mathbb{S}^3, \mathbb{S}^7)$, (cohomology, K-theory, elliptic cohomology). (Basically, quarternionize everything.) Or again, 1998–10: How to complexify braid theory? Or, already in 1976–24 ("The A–D–E problem") to find a general classification theorem from which all of the many and various occurrences of the A–D–E Dynkin diagrams will follow. Now tell me, is this the Russian way or the French way?

Robert McLachlan

CONFERENCES

7th Australia–New Zealand Mathematics Convention (ANZMC2008)

(Dept. of Maths & Stats, University of Canterbury, Christchurch, New Zealand)
Website: http://www.math.canterbury.ac.nz/ANZMC2008/

The convention will be held in Christchurch, New Zealand, **8–12 December 2008**. ANZMC2008 will be a combined meeting of the Australian and New Zealand Mathematical Societies, and will incorporate the annual New Zealand Mathematics Colloquium.

Invited speakers

- Béla Bollobás (Cambridge, UK and Memphis)
- Carl de Boor (Wisconsin-Madison)
- Vaughan Jones (Berkeley), *AustMS Distinguished Lecturer*
- Kerry Landman (Melbourne)
- Gregory F. Lawler (Chicago)
- Charles Leedham-Green (Queen Mary, London)
- John W. Morgan (Columbia)
- Karen Parshall (Virginia)
- James Sneyd (Auckland), *ANZIAM Lecturer*
- Angelika Steger (ETH Zurich)
- Neil Trudinger (ANU), *NZIMA Lecturer*

Special sessions and contributed papers: The convention includes approximately 15 themed special sessions, and will feature a substantial and broad range of contributed papers. Abstract submission is now open (see website for details of how to submit an abstract).

Student prizes and support: The AustMS BH Neumann prize and NZMS Aitken prize for the best student talks at the convention will be awarded at the convention dinner. Small travel grants will be available for students attending the convention. Consult the website for eligibility details.

Earlybird registration (until 31/10/08): $280 (full), $140 (student/retiree). Fees include the convention dinner. Registration is via the website.

Organisers: See website for committee details.

- Rick Beatson (Conference director)
- Mathai Varghese (AustMS Vice-President annual conference)

Contacts: By email

- anzmc2008@uco.canterbury.ac.nz (for registration, accommodation, payments)
- ANZMC2008@math.canterbury.ac.nz (for academic and other enquiries)

Deadlines: October 31 2008 (Abstract submission and early-bird registration)

NZMRI/NZIMA Summer School 2009
Algorithmic Information Theory, Computability and Complexity
January 4-9 2009, talks begin the afternoon of the 4th

The annual NZIMA/NZMRI summer workshop this year will be in beautiful Napier based at the Crown Hotel. The topic will be areas based around algorithmic information and computability/complexity. We have a distinguished group of speakers whose specific topics are listed below. They are each giving a minicourse aimed at beginning graduate students.

As usual, there will be talks in the morning, the afternoons are free, and a talk in the evening. Wednesday will be free and involve a traditional climb, which is not compulsory.

- Denis Hirschfeldt (University of Chicago) Basic Algorithmic Complexity (3 lectures)
- Ted Slaman (University of California at Berkeley) Randomness for Continuous Measures (4 lectures)
- Alexander Kechris (Caltech) Ergodic Theory and Descriptive Set Theory (4 lectures)
- Michael Yampolsky (Toronto) Computability of Julia sets (3 lectures)
- Eric Allender (Rutgers) Probabilistic Computation (4 lectures)

The current timetable is listed on the website below.

As usual, accommodation and some meals are covered for New Zealand based participants. Some graduate support for travel is available. Partners/families are encouraged but our funds do not cover their costs as usual. Overseas attendees must cover all costs, but there is no registration fee.

We anticipate that this will be a well-attended meeting as were the earlier New Plymouth and Kaikoura meetings. There will be an upper limit on numbers, since the conference venue holds *at most* 70 people.

Be quick to register!

The planned date for the close of registration is October 20th. To register go to the online registration linked to the home page at http://www.mcs.vuw.ac.nz/Events/NZMRI2009/WebHome

Rod Downey and Noam Greenberg, Victoria University of Wellington

NOTICES

Student support to attend MISG 2009 (Wollongong) and/or ANZIAM 2009 (Caloundra)

The New Zealand Mathematical Society is offering grants to students who attend the Mathematics in Industry Study Group Workshop (MISG) in Wollongong, NSW, Tuesday, 27 January - Saturday, 31 January, 2009. To be eligible students must be enrolled at a New Zealand University and are expected to be a member of the New Zealand Mathematical Society.

Further, the New Zealand Branch of ANZIAM is offering grants to students who attend the Annual ANZIAM Conference in Caloundra, Queensland, Sunday, 1 February - Thursday, 5 February, 2009. Preference will be given to students who are presenting a talk. To be eligible students must be enrolled at a New Zealand University and should be members of the New Zealand branch of ANZIAM.

To apply for funding for either or both conferences students should complete the usual NZMS financial application form available at http://www.math.waikato.ac.nz/NZMS/support.html marking the entry:

"Type of Assistance Sought": Travel to ANZIAM09+MISG09 (amend as appropriate)

In addition to including details of NZMS membership please also include details of ANZIAM(NZ) membership. You will require all the following

- 1. Contact details (name, address, email)
- 2. Current programme of study.
- 3. Details of society membership of NZMS and ANZIAM(NZ).
- 4. Title of presentation to be given at ANZIAM (if any).
- 5. Estimated total expenditure (including a breakdown of this expenditure)
- 6. A supporting statement from Supervisor, Head of Department, or similar.

The form is to be sent to the address below before the deadline of Wednesday, 12 November, 2008. The amount of money available for individual students will be decided shortly after that date.

(Please note that MISG funding is separate from the usual process of financial support provided by the NZMS and will have no effect on future eligibility for such support.)

Details of membership of the NZMS are available at http://www.math.waikato.ac.nz/NZMS/membership.html and of membership of ANZIAM(NZ) is at

$$http://www.anziam.org.au/ANZIAM + New + Zealand + Branch$$

Dr. Winston L. Sweatman
Institute of Information and Mathematical Sciences
Massey University at Albany
Private Bag 102904
North Shore 0745
Auckland
New Zealand

Notice of annual general meeting

The Annual General Meeting of the New Zealand Mathematical Society will be held during the New Zealand Mathematics Colloquium which is this year incorporated into the 7th AustraliaNew Zealand Mathematics Convention at University of Canterbury

$$http://www.math.canterbury.ac.nz/ANZMC2008/$$

Items for the Agenda should be forwarded by Wednesday the 1st of December to the New Zealand Mathematical Society Secretary.

Call for nominations for New Zealand Mathematical Society Council positions

Nominations are called for Councillors and an Incoming Vice-President on the New Zealand Mathematical Society Council.

The term of office of a Council member is three years. Council members may hold office for two (but no more than two) consecutive terms. Existing Councillors may be nominated for the position of Incoming Vice-President.

Nominations should be put forward by two proposers. The nominee and the two proposers should be current Ordinary or Honorary members of the New Zealand Mathematical Society. The nominations, including the nominee's consent, should be forwarded by Wednesday the 1st of December to the New Zealand Mathematical Society Secretary.

If nominations are sent by email, the two proposers and the nominee should each send separate email messages to the Secretary.

Application for Graduate Membership, Accredited Membership, and Fellowship of the New Zealand Mathematical Society

The Society has an accreditation scheme in which there are Fellows, Accredited Members, and Graduate Members of the NZMS. Applications are considered by the Accreditation Committee, set up by the NZMS Council. Full details are available together with an application form on the internet site: http://www.math.waikato.ac.nz/NZMS/accreditation.html .

At present Member applications are welcomed at any time. If you would like to be considered or would like to nominate someone, please send completed forms to

The Accreditation Secretary
Professor Gaven Martin
Institute of Information and Mathematical Sciences
Massey University
Private Bag 102 904
North Shore Mail Centre 0745
AUCKLAND

OECD Global Science Forum Report on Mathematics in Industry

In July this useful report was released. NZ is a member country of the Organisation for Economic Co-operation and Development (OECD). Over the last couple of years the OECD sponsored an international consultation process through its Global Science Forum to assess the present state of the interface between innovation, science, and mathematics. Specifically it enquired as to whether this is functioning in an optimal way. At the conclusion of this process, specific recommendations are made in this report on a range of possible initiatives for member countries to consider (some of which have already been tried in NZ). These are in the areas of:

* Mechanisms for the Interaction of Mathematics for Industrial Innovation;
* Education and Training;
* Academic Infrastructure;
* Industrial Infrastructure;
* National and International Coordination;
* Creation of an International Task Force to further the goals of the Report.

The full report is available on the website:

www.oecd.org/dataoecd/47/1/41019441.*pdf*

If appropriate, discussions could be held at the 7th ANZMC in Christchurch in December. It seems initiatives in a small country like NZ, that these should be coordinated nationally through a national entity to avoid duplication and competition.

Graeme Wake, g.c.wake@massey.ac.nz

Application for membership of the NZMS

The New Zealand Mathematical Society (Inc.) is the representative body of professional mathematicians in New Zealand, and was founded in 1974. Its aims include promotion of research in the mathematical sciences, the development, application and dissemination of mathematical knowledge within New Zealand, and effective cooperation and collaboration between mathematicians and their colleagues in New Zealand and in other countries.

Membership categories:

(Full details at www.math.waikato.ac.nz/NZMS/NZMS.html)

Ordinary*	$36 p.a.	
Reciprocal	$18 p.a.	

For overseas residents who are fully paid-up members of societies with which the NZMS maintains a reciprocity agreement (including the American Mathematical Society, the Australian Mathematical Society, the Canadian Mathematical Society, the London Mathematical Society, and the Mathematical Society of Japan).

Student*	$7.60 p.a.	For currently enrolled students in NZ
Overseas student	$18 p.a.	For currently enrolled students in overseas

(GST is added to rates for NZ residents.)

Members can subscribe to the New Zealand Journal of Mathematics (http://www.math.auckland.ac.nz/NZJM/index.html) at a reduced rate.

Members can also elect to make a donation, when paying their subs, to the NZMS Endowment for Student Support.

* The Society offers NZ students and new staff a special free one-year membership.

Please complete below and mail to:

John Shanks, NZMS Membership Secretary,
Department of Mathematics and Statistics,
University of Otago, P.O. Box 56, Dunedin, NZ

or Fax: +64 (3) 479 8427

E-mail: jshanks@maths.otago.ac.nz

NZMS Application Form

Name: _____ Title: _____

Address: _____

_____

_____

An institutional address is preferred

E-mail: _____

Membership category: ☐ Ordinary ☐ Reciprocal ☐ Student ☐ Overseas student

If Reciprocal then complete this:

I am a fully-paid up member of _____

☐ I wish to receive the NZ Journal of Mathematics at special rate

Signed: _____ Date: _____

Please send no money now. You will be invoiced once your application is accepted.

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