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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY

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PUBLISHER'S NOTICE

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

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PRESIDENT'S COLUMN

Congratulations to the following recipients on their recent awards:

1. Bruce van Brunt, Mike Hendy, and Winston Sweatman have been awarded Fellowships of the New Zealand Mathematical Society.
2. Geoff Whittle has been awarded the inaugural Aitken Lectureship. Funded by the London and New Zealand Mathematical Societies, this lectureship is part of the new reciprocal arrangement with the LMS. Geoff will be visiting the United Kingdom in 2011.
3. Mihály Kovács was awarded the 2010 NZMS Early Career Award "for his innovative research in the field of stochastic partial differential equations, particularly their numerical approximation."
4. Rachael Tappenden was awarded the 2010 NZMS Aitken Prize for her talk "Extensions of compressed sensing" at the NZMS Colloquium.

Thank you to the organizing committee at the University of Otago for last year's Colloquium. Particularly pleasing to see was the large number of new faces in attendance. This bodes well for the future of New Zealand mathematics.

Also thank you to Alex James and Rachael Tappenden for producing this post-quake issue of the Newsletter. Everything at the University of Canterbury is still far from normal. While we will no longer be teaching in tents after Easter, we are still not back in our offices and won't be until Semester 2. With many staff continuing to work at home, commuting in for lectures and meetings, and returning to home afterwards, it's like being a student again but with the added responsibilities of teaching and supervision.

Charles Semple
President

EDITORIAL

Kia ora koutou, welcome to another issue of the newsletter.

Firstly, I'd like to thank Rachael Tappenden for all her hard work putting together this issue without all the usual niceties like a desk, an office or even a building to work in. We'd also like to welcome the Formal Methods Group in the Department of Computer Science at Waikato as new contributors to the newsletter.

Finally, as some may know this is my last edition of the newsletter. I'd like to thank everyone who made the job thoroughly enjoyable and far less onerous than some people promised it would be. In particular this includes Phil Wilson and Rachael Tappenden for excellent editorial support, all the office staff at UC (Julie, Pauline, Sarah and Penny) for putting up with our last minute requests and the technical help of Steve, Paul and Dietrich. I'm sorry I have to give up the position but circumstances have conspired that make it unfeasible to continue and I would like to wish the next editor all the best.

Alex James
Editor

LOCAL NEWS

AGRESEARCH

Sadly, Roger Littlejohn passed away at Otago Community Hospice in Dunedin on Sunday, 6th March. Roger was a statistician at Invermay and had worked with AgResearch and its predecessors for almost 30 years. He had been ill for some time, but his death was nonetheless sudden. He was 56 years old.

Roger was an expert in the analyses of time series and in the application of hidden Markov models, and made major contributions in the analysis of hormone profiles and data on animal positions through time. He devised practical solutions to the diverse range of problems that were presented to him and was greatly appreciated by his workplace colleagues. Roger was always ready to help and promote others, as can be seen in his mentoring of a number of project and thesis students. He contributed to over 200 publications. Roger will be missed as a colleague and friend by us all.

Amy Van Wey presented a poster on nutrient transport within bacterial biofilms at the International Symposium on Dietary Protein in Auckland in March. Amy also gave a talk at the Riddet Institute on human intestinal bacterial biofilms in February.

Phuong Nguyen attended the Congress on Steroid Research in Chicago in March and presented her work on a dynamic model of how enzymes control the balance of steroid hormone synthesis. Phuong was awarded the National Institutes of Health Young Investigator Travel Award to assist towards her travel. Phuong also visited Alan Conley at UC Davis to discuss steroid pathways.

Paul Shorten attended the ANZIAM meeting in Adelaide in February and gave a talk on a mathematical model of obstructed diffusion in skeletal muscle.

Kumar Vetharaniam attended the New Zealand Agricultural Greenhouse Gas Research Centre Conference in Palmerston North in February.

Paul Shorten

THE UNIVERSITY OF AUCKLAND

DEPARTMENT OF COMPUTER SCIENCE

Jim Goodman was named a Fellow of the ACM (one of 41 new ones worldwide) in recognition of his lifetime contributions to parallel processor and memory system design.

Jonathan Rubin (PhD student) and Ian Watson have been invited by the steering committee for the Annual Computer Poker Competition to co-chair for the coming year's competition.

We are currently recruiting a Lecturer position within the Department and had at least 62 applications.

VISITORS

Dr. Anko Boerner from the German Aerospace Center; Dr. Bok Suk Shin from Pusan National University, Korea; Warwick Irwin from the University of Canterbury; Olga Kharlampovich from McGill University, Canada; Prof. J. Gruska from Masaryk University, Czech Republic; and Alexei Miasnikov from Stevens Institute of Technology, USA.

SEMINARS

Wang Han (Nanyang TU) "Fast obstacle detection for USV using stereo vision".

Jozef Gruska (Masaryk U) "PHYSICS and INFORMATICS as two windows to see, explore and understand the world".

Anko Börner (German Aerospace Center) "Real-time dense stereo mapping for multi-sensor navigation".

Melanie Siebenhaar (TU Darmstadt) "Cloud Computing Insights and Selected Research Challenges".

Neal Glew (Intel Corporation) "Vectorisation in a Functional Language Compiler".

Paul Denny "CodeWrite — Supporting Student-Driven Practice of Java".

Bok Suk Shin (Pusan National University) "Pattern Recognition Using A Fuzzy Weights Decision Method based on Degree of Contribution".

Ludwig Staiger (Martin-Luther-Universitat Halle-Wittenberg) "Hausdorff Dimension & Constructive Dimension: The Case of Exact Dimension".

Sandino Morales "A Kalman filter-based approach for improving disparity values for image sequences".

Mark Wilson

DEPARTMENT OF ENGINEERING SCIENCE

Our lovely long summer is almost over and a new semester is upon us. Since the last NZMS newsletter the Department of Engineering Science has received a series of facelifts, academic promotions, a new cohort of students in both the Engineering Science and Biomedical Engineering and continued research excellence in research outputs. It has bid a fond farewell to its previous HOD, Prof. Andrew Pullan, after his three year term in office and welcomes Matthias Ehrgott as its new figure head and recently appointed Professor.

Professor Ehrgott is a world authority in operations research specialising in modelling and solving multiple criteria decision-making problems. His research contributions are broad ranging from optimization theory, algorithm development to real world application such as in transportation or medicine. His book on Multicriteria Optimisation is used as reference source around the world.

Recently Matthias has had a new academic text published described below.

Trends in Multiple Criteria Decision Analysis, International Series in Operations Research & Management Science, Vol. 142, Editors Ehrgott, Matthias; Figueira, Josè; Greco, Salvatore 1st Edition., 2010, XIX, 462 p. 49 illus., Hardcover, ISBN: 978-1-4419-5903-4, Springer.

The text is about Multiple Criteria Decision Analysis (MCDA), the study of methods and procedures by which concerns about multiple conflicting criteria can be formally incorporated into the management planning process. A key area of research in OR/MS, MCDA is now being applied in many new areas, including GIS systems, AI, and group decision making. This volume is in effect the third in a series of Springer books about MCDA (all in the ISOR series), and it brings all the latest advancements into focus. Looking at developments in the applications, methodologies and foundations of MCDA, it presents research from leaders in the field on such topics as Problem Structuring Methodologies, Measurement Theory and MCDA, Recent Developments in Evolutionary Multiobjective Optimization, Habitual Domains and Dynamic MCDA in Changeable Spaces, Stochastic Multicriteria Acceptability Analysis, Robust Ordinal Regression, and many more challenging issues. The Department looks forward to providing him with its support and commitment in order to maintain the standards of excellence that we have enjoyed for many years.

VISITORS

The Department has had three visitors come and share its summer months. Dr. John Sader of the Dept of Mathematics from the University of Melbourne, a fluid dynamacist, was the visitor of Dr. Richard Clark.

Professor Shane Henderson from Cornell University, US, visitor of Dr. Andrew Mason, gave an interesting presentation on his work on how to optimise ambulance logistics

Dr. Karen Wilcox from MIT in the US, an old graduate of the Department and member of our advisory board, visited to give a talk in the field of Fluids and Aeronautics visited.

PHD THESIS

The Department would like to congratulate Anthony Downward on his recent PhD award supervised by Dr Golbon Zakeri and Prof. Andrew Philpott.

His thesis was on the “Impact of Transmission on Strategic Behaviour in Electricity Markets”. In

his thesis, he investigated the impact of transmission on the strategic behaviour of firms competing in deregulated electricity wholesale markets. Assuming uniform-price auctions and locational marginal pricing, he investigated the properties of the dispatch problem over networks that are constrained and/or lossy. Without loops and losses he derived important results as to how price varies as a function of demand at each node. Whereas, for networks with loops and losses, he discussed the non-convexity of the dispatch problem and showed that the optimal value function may be non-convex. He modelled the strategic firms as Cournot agents and discussed how the assumptions surrounding the rationality of the agents can influence the equilibrium outcomes. Under a full-rationality assumption, he introduced the concept of 'candidate equilibria' and examined the conditions on the parameters of the network that ensure that these are indeed valid equilibria to the Cournot game.

OTHER AWARDS

Xiaoyang Qin, an Engineering Science undergraduate scooped the 2010 New Zealand Geotechnical Society Student Award. Xiaoyang's presentation was entitled "Numerical and experimental investigation of foundation material and geometrical nonlinearity". His research combined the expertise in soil and structural dynamics with numerical and experimental work.

SEMINARS

Charles Unsworth (University of Auckland) gave a talk entitled "Cell Patterning Human Neurons & Astrocytes" at the Salk Institute, La Jolla, California, January 2011.

Prof. Matthias Ehrgott attended an international conference on Operations Research and Optimization in Theran, Iran, 26–28 January, as invited speaker where he presented a keynote address on "Multi-objective Optimisation: Interfaces between Mathematics and the Real World".

Charles Unsworth

DEPARTMENT OF MATHEMATICS

Bill Barton recently travelled to Berlin for the Opening of the Permanent Office of IMU, which is associated with the Weiss Institute. He then went on to the European conference on Mathematics Education (CERME) in Poland. He returned to NZ via Korea (where the next ICME and ICM conferences will be held) and then Beijing for the Executive meeting of ICMI and a China-ICMI Seminar. That Seminar included questioning by the principals of China's leading schools of the structure of secondary education, driven as it is by an Olympiad-based curriculum.

He reports that recent ICMI issues include the call for Discussion Group themes for the 2012 ICME conference in Korea (see `http://www.icme12.org/`) and the imminent launch of ICMI Study 18 on "Teaching Statistics in School Mathematics". The IMU/ICMI Klein Project has recently received a boost by winning an AIM Workshop in Palo Alto in November this year (`http://kleinproject.org`).

Bill has been appointed as Associate Dean (International) of our Faculty of Science. Since he will now spend much of his time jet-setting he has relinquished his post as Head of the Mathematics Education Unit in our Department of Mathematics, and Judy Patterson has been appointed as the new MEU Head.

Marston Conder and our new appointee Dimitri Leemans will be associate partners in a new EuroCoRE (European Centre of Research Excellence) programme that has just been approved by the European Science Foundation (ESF) in one of its priority areas: "Graphs in Geometry and Algorithms", with annual funding of approximately 1.5 million Euros. Also Marston will give an invited lecture at an International Conference on "Groups, Graphs and Networks" at Beijing in April.

Dr Graham Donovan is now a Lecturer here.

Steven Galbraith has been promoted to Associate Professor. He visited Macquarie University (Sydney) on March 21–23, for research collaborations with Igor Shparlinski and Ron Steinfeld.

David Gauld attended the NZMS Colloquium in Dunedin 2010 December 6–9 and the Workshop on Dynamical Systems in Raglan on 2011 January 9–14.

Jari Kaipio has been promoted to Professor, and consequently the Applied Mathematics Unit now has 2 professors for the first time.

The algebraist Dr Dimitri Leemans will arrive here in September, as a Senior Lecturer.

Warren Moors has been promoted to Associate Professor.

Claire Postlethwaite has been promoted to Senior Lecturer, and she was was awarded a Faculty of Science Dean's Award for Early Career Teaching Excellence in 2011.

Philip Sharp was absent for our first week of lectures, since he was a member of a Civil Defence

team operating in Christchurch after the earthquake on February 22 which severely damaged Christchurch. Philip's account of his tour of duty is published separately in this Newsletter.

Tom ter Elst has been promoted over the bar in the Senior Lecturer scale.

Dr Caroline Yoon is now a Lecturer in the Mathematics Education Unit.

The University of Auckland has arranged with the University of Canterbury for some of their students to study here temporarily, gaining credit at Canterbury for the work which they do here. Our Department now has 15 students from Canterbury taking Stage 1 courses here, plus a student taking a Stage 2 course here.

Our Algebra Miniconference on February 16–18 featured 9 lectures by visitors to the Departments of Mathematics and of Computer Science:

Josef Sirán (Open University) "Residual finiteness of groups and highly symmetric maps on surfaces".

Marston Conder "Distinguishing triangle groups by their finite quotients".

Young Soo Kwon (Yeungnam) "t-balanced regular maps for some groups".

Bettina Eick (Braunschweig) "Computing associative algebras satisfying a polynomial identity".

Peter Brooksbank (Bucknell) "A new algorithm to intersect two classical groups".

Alexander Hulpke (Colorado State) "Computing conjugacy classes and centralizers in matrix groups".

Olga Kharlampovich (McGill University) "Model theory and algebraic geometry for groups".

Alexei Miasnikov (McGill University) "Algorithmic problems in groups".

Recent visitors include Ali Abdi (Tabriz University, Iran), Prof. Avi Berman (Technion, Haifa), Dr Nadja Betzler (Technical University of Berlin), Arnaud Brothier (Université de Paris VII), Prof. Peter Brooksbank (Bucknell University), Prof. Kevin Burrage (Oxford University and QUT), Dr Pamela Burrage (QUT), Prof. Andreas Cap (University of Vienna), Prof. Fred Chipman (University of California - Berkeley), Prof. Bettina Eick (Universität Braunschweig), Prof. David Fischer (Indiana University), Prof. Martin Golubitsky (Ohio State University), Prof. Matthias Hammerl (University of Vienna), Prof. Lauri Harhanen (Aalto University, Finland), Prof. Alexander Hulpke (Colorado State University), Dr Janne Huttunen (University of Eastern Finland), Prof. Judy Kennedy (Lamar University), Dr Bernd Krauskopf (Bristol University), Prof. Peter Kunkel (University of Leipzig), Prof. Young Soo Kwong (Yeungnam University, South Korea), Prof. Sergio Macias (Universidad Nacional Autónoma de México), Dr Niall Madden (NUI Galway), Prof. Ross McPhedran (University of Sydney), Prof. Peter Monk (University of Delaware), Dr Scott Murray (University of Canberra), Dr Hinke Osinga (Bristol University), Prof. El Maati Ouhabaz (University of Bordeaux I), Prof. Allan Pinkus (Technion, Haifa), Dr Chris Poulton (University of Technology, Sydney), Dr Rachel Quinlan (NUI Galway), Prof. Jan Saxl (University of Cambridge), Dr Pavla Sehnalová (Brno University of Technology), Prof. Mary Silber (Northwestern University), Dr Josef Slapal (Brno University of Technology), Dr Emily Stone (Montana State University), Prof. Jan van Mill (Vrije University, Amsterdam), Prof. Felipe Voloch (University of Texas, Austin), Prof. Jae Heon Yun (Chungbuk National University, South Korea), Dr William Zwicker (Union College, New York).

Congratulations to Heiko Dietrich, who has been awarded a highly-competitive Marie Curie Fellowship for a 2-year period. We hope that the Fellowship can commence in late 2011, after he completes his University of Auckland PostDoc position.

Kerri Spooner, from Long Bay College, has a secondary teachers' study award.

Emily Harvey won the prize for best applied mathematics talk, at the postgraduate conference in Westport.

Three PhD students have recently completed their theses: Noor Aishiki Adam, "Weaving, culture and mathematics", Wen Duan, "Mathematical modelling of adult GnRH neurons in the mouse brain and its bifurcation analysis" and Yousaf Habib, "Long-term behavior of G-symplectic methods".

SEMINARS

Dan Popovici (Université Paul Sabatier, Toulouse) "Deformation limits of projective and Moishezon Manifolds".

Jan Felipe van Diejen (Universidad de Talca) "Computing zeros of hypergeometric functions using systems of integrable ODE".

Ross C. McPhedran (University of Sydney) "Metamaterials, transform optics and cloaking".

David Fisher (Indiana University) "Coarse geometry of solvable groups".

Jan Saxl (University of Cambridge) "Variations on themes of Frobenius and Burnside".

Caroline Yoon (Faculty of Education, University of Auckland) "Mapping the development of students' conceptual understandings of mathematics".

Anders Aaen (Aarhus University) "The ground state energy of the dilute Bose gas".

Scott Murray (University of Canberra) "An application of Magma to groups acting on trees".

Arnaud Brothier (Université de Paris VII) "Representations of countable groups".

Andreas Cap (University of Vienna), "The Cartan connection associated to a conformal structure" (2 lectures).

John McCabe Dansted (UWA) "Axioms for obligation and robustness with temporal logic".

Niall Madden (NUI Galway) "Numerical solution of singularly perturbed problems".

Gerhard Frey (Institute for Experimental Mathematics, Essen) "Elliptic curves: facts, conjectures and applications" (Public lecture).

Rachel Quinlan (NUI Galway) "Guessing at our mental models - what are our students doing?".

Allan Pinkus (Technion, Haifa) "Finding solutions with small support: how $L1$-approximation promotes sparsity".

Nadja Betzler (Technical University of Berlin), "Parameterized algorithmics for Kemeny's voting system".

Carlo Laing (Massey University) "Chimera states in heterogeneous Kuramoto networks".

Felipe Voloch (University of Texas, Austin) "Local-global principles in the arithmetic of curves".

Greg Chini (University of New Hampshire) "A-priori low-order modeling of porous medium convection".

Matthias Hammerl (University of Vienna) "Homogeneous Cartan geometries" (2 lectures).

Douglas Wilson "Kernels of semigroups generated by elliptic operators on domains".

Ilya Chevyrev "Polytopes representing comparative probability orders".

Arkadii Slinko "Hierarchical games".

Emily Stone (University of Montana) "How receptor dynamics can shape excitatory postsynpatic signaling in the hippocampus".

Avi Berman (Technion, Haifa) "The trials of a mathematician doing research in maths education".

Michael Lockyer "Topological quantum field theories with finite gauge groups".

John Bardsley (University of Montana) "Solving inverse problems using Bayesian statistical methods".

Alexander Hulpke (Colorado State University) "Abstract algebra as an applied course".

Garry J. Tee

DEPARTMENT OF STATISTICS

Our thoughts go out to colleagues affected by the Canterbury earthquake. Here in Auckland things have been relatively quiet over the summer. We have welcomed our new Professor of Biostatistics, Thomas Lumley, who joined us from the University of Washington last year.

Congratulations to Ross Ihaka, who won the Catalyst Lifetime Achievement in Open Source Award at the NZ Open Source Awards 2010, for his development of R. This is just the latest in Ross's long list of awards for his achievements — however it may be the first and last time that he shares an award platform with the IRD, who were also open-source winners!

Maxine Pfannkuch won a $200K grant from the NZ Council for Educational Research's Teaching and Learning Research Initiative, entitled 'Bootstrapping statistical inferential reasoning', in partnership with Sharleen Forbes of VUW and John Harraway of U Otago. The project aims to deliver a better understanding to first-year and Year 13 students of how inference works, using bootstrapping and randomisation methods as a central foundation. The approach will be trialled on a small group of students first, and we are all very interested to hear how it progresses.

Special congratulations to Nancy Wong of our admin staff, whose cheerful face is the first point of contact for visitors to our department. Nancy's never-ending efficiency, innovation, and cheerfulness was recognised by a university General Staff

Excellence Award for 2010. A handful of awards are given each year, and typically go to teams developing large-scale software systems for the university, so it was a real delight to see Nancy recognised on the same platform. Nancy, Alexandra and Karen in the office go to huge lengths to make our lives run smoothly, and awards like this are a great way to show how much we appreciate them!

And at last, for the first time in seven years, someone in the department has succeeded in producing a baby girl! Congratulations to Nick Shears on the birth of Calla Ann, and to PhD students Sam McKechnie and Jonathan Briggs on the births of daughter Madeleine and son Theo respectively. Our total is now 25 boys and 6 girls born since 2000. Watch out boys, we now have enough for an all-girl five-a-side AND one referee ...

Rachel Fewster

AUCKLAND UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING AND MATHEMATICAL SCIENCES

In February 2010, Professor Jeff Hunter was appointed to a part-time position as Head of Research in the Mathematical Sciences. In July he accepted secondment to a full-time position as Head of Mathematical Sciences, in order to assist the School to undertake a major change in its staffing structure, where his background proved to be of considerable assistance.

At the end of last year five staff (Neil Binnie, Helen Petersen, Peter Watson, Rowena West, Stuart Young) took early retirement. This brought about the appointment of five new permanent lecturers (Drs Hyuck Chung, Robin Hankin, Jeong (Kate) Lee, Guanghua (Andy) Lian and Jiamou Liu).

New permanent staff. From left to right: Robin, Jiamou, Kate, Hyuck, Andy.

Dr Hyuck Chung — Lecturer in Applied Mathematics. Hyuck was appointed last year on a fixed term contract, following post doctoral experiences at the University of Otago, University of Auckland and University of Illinois Urbana-Champaign. His PhD is from the Department of Mathematics at the University of Auckland.

Dr Robin Hankin — Lecturer in Statistics. Robin is joining the School from the Department of Land Economy at the University of Cambridge where he was a Senior Research Associate. He has had teaching experience at the National Oceanography Centre in Southampton and a five year period at the University of Auckland in the School of Environmental Science. His PhD is from the Engineering Department at the University of Cambridge.

Dr Jeong (Kate) Lee — Lecturer in Statistics. Kate is joining the School from the University of New South Wales in Sydney where she has been a Research Associate following the completion of her PhD at Queensland University of Technology. Kate also has a first class MSc in Applied Mathematics from the University of Auckland.

Dr Guanghua (Andy) Lian — Lecturer in Applied Mathematics. Andy completed his PhD in Mathematical Finance from the University of Wollongong early last year and has recently been a post doctoral research fellow at the University of Adelaide. Andy also has an MA in Business Management from Huazhong University of Science and Technology at Wuhan, China and a BSc in Applied Mathematics with a minor in Computer Science from Sichuan University, Chengdu, China. In addition he is completing studies as a Chartered Financial Analyst having qualified for a Certificate of Quantitative Finance.

Dr Jiamou Liu - Lecturer in Computer Science. Jiamou is joining the School from the University of Leipzig, Germany, where he has been a research fellow. Jiamou completed his PhD from the University of Auckland in the field of Theoretical Computer Science. During his PhD he also studied in Cornell University, USA and worked in Microsoft Research Asia, Beijing, China.

In addition to the above permanent appointments, a number of fixed term full-time appointments were made to Joy Fouchee, Martine MacGregor-Reid and Dr Alana van der Merwe to be involved primarily in the pre-degree certificate programmes. This enabled us to reduce the number of part-time casual appointments and will ensure that from the beginning of Semester 2 all academic staff teaching into degree programmes will be research active and returnable in the PBRF exercise.

Assoc Prof Jiling Cao presented an invited talk on embedding properties of Wijsman hyperspaces

at the 5th Japan-Mexico Conference on Topology and its Applications held at Colima, Mexico, 27 September – 1 October 2010. In November 2010, Prof Heikki J. K. Junnila from the University of Helsinki visited the School. During his visit, Heikki continued his joint research in analysis and topology with Jiling and Warren Moors (from the University of Auckland). In December 2010, Jiling attended the NZMS Colloquium held at the University of Otago and also the Quantitative Methods in Finance Conference held at University of Technology Sydney. In addition, Prof Yasunao Hattori (from Shimane University, Japan) visited Jiling in March 2011 for joint research in topology.

Assoc Prof Paul Cowpertwait attended the ANZIAM Conference in January 2011, and presented a paper on the empirical analysis of a continuous-storm-type spatiotemporal stochastic rainfall model fitted to data from the Roma region, Italy. This work has recently appeared as a featured "spotlight" article in Water Resources Research. Paul is currently engaged in a large overseas research contract that aims to develop spatially representative rainfall and extreme events for a decision support system in Europe.

Dr Sergiy Klymchuk was on sabbatical leave in semester 2 2010 visiting universities in Japan, Germany and Ukraine. During this period, he completed several journal and conference papers and gave three seminar talks at the Department of Mathematics and Institude for Advanced Mathematical Sciences of the Meiji University, Japan. He also submitted a book titled *Paradoxes and Sophisms in Calculus* for the Mathematical Association of America (MAA) to publish. His recent book *Counterexamples in Calculus* published by the MAA was on the list of Outstanding Academic Titles in 2010 by the Choice Magazine (Choice Magazine is a publication of the American Library Association, and this list reflects the best in scholarly titles reviewed by *Choice* and brings with it the recognition of the academic library community).

SEMINARS

Bakhadyr Khoussainov (The University of Auckland) "Update games".

Steven Galbraith (The University of Auckland) "Hot topics in Mathematics of public key cryptography".

Robin Hankin (AUT University) "Getting something from nothing: the emulator".

Yasunao Hattori (Shimane University) "Topological aspects of continuous posets of formal balls".

David Welch (Pennsylvania State University) "Estimating parameters of a contact network for epidemic data".

Jiling Cao

UNIVERSITY OF CANTERBURY

DEPARTMENT OF MATHEMATICS AND STATISTICS

Canterbury was hit again by a major earthquake. This one had a magnitude of 6.3 and struck at 12.51pm on 22 February 2011, the second day of term. Although smaller in magnitude than the September 4 earthquake last year, it was shallow (at a depth of 5km) and centred close to the city (10 km south-east of Christchurch). The experience shook all of us, both physically and emotionally, as the earthquake had a devastating effect on the city. People have suffered the loss of family and friends. Others experienced the devastation of their homes and physical hardships of no power, water or sewerage. The thoughts and good wishes of the department are with all of our community at this difficult time.

The University of Canterbury was extremely fortunate that there were no building collapses and no fatalities or serious injuries on campus. The physical campus was closed following the earthquake, and teaching and research activities had been suspended for almost three weeks, and a university-wide night-time curfew remains in place.

The seismic impact of the 22 February event has been estimated at 150% of building code compliance, reflecting the need for checks of all buildings to assess the state of the buildings and their readiness for use. At the time of writing department staff are still not allowed back to their offices, and we can be best described as a virtual department at the moment, although one with a strong team spirit.

It was only on March 14 that the university saw a progressive re-start of teaching activities. As of Monday 28 March more than 80 percent of the normal university-wide programme will be taught. Term dates are changed, with a shorter term break, to compensate somewhat for lost teaching time. However, due to the limited number of teaching spaces available, a major re-organization of how we teach our courses was necessary. Some of our courses have reduced lecture hours or are taught completely on-line. Some courses are taught in newly erected tents on campus or other unfamiliar locations. Also lecture hours change from week to week.

These exceptional circumstances come at a particularly bad time for our mathematics programme. After years in the making, brought on by the university-wide change to 15 points courses, a complete re-organization and redesign of our 200-level mathematics courses is implemented this year. All these new courses must now be taught and developed in a challenging environment. Special thanks have to go to Steve Gourdie, Paul Brouwers and Allen Witt who again spent long hours with the computing system to bring it back on and to make it ready for the increased demands through on-line delivery of course material and on-line testing. The department is also grateful for the support and offers of help it received from other mathematics departments around the country.

On a positive note, Charles Semple has been awarded this year's Research Award by the NZ Mathematical Society. This award was instituted in 1990 "to foster mathematical research in New Zealand and to recognise excellence in research carried out by New Zealand mathematicians." The citation for Charles' award reads as follows: for his landmark contributions to combinatorics and, in particular, matroid theory, as well as leading work in phylogenetics and computational biology.

Congratulations to James Degnan, who is one of two recipients of this year's College of Engineering Early Career Research Award, and to Irene David for being awarded a UC Teaching Award.

Rick Beatson and Igor Rychkov have been granted a top of the line Fermi Tesla GPU from the NVIDIA Academic Partnership Program to develop massively parallel RBF implementations.

Congratulations to Professor Emeritus Roy Patrick Kerr, former Head of Department, who has been appointed a Companion of the New Zealand Order of Merit (CNZM), for services to astrophysics, in the New Year's Honours 2011. Roy is best known for discovering, in 1963, the Kerr vacuum, an exact solution to the Einstein field equation of general relativity.

Congratulations to Rachael Tappenden, who was awarded the NZ Mathematical Society's Aitken Prize for the best student talk at the recent NZMS Colloquium for her talk "Extensions of Compressed Sensing", and to Anna MacDonald, who won the prize for the best Statistics presentation at December's postgraduate conference.

Best wishes for their future careers go to our recent doctoral graduates Scott Graybill and Xin Zhao, and to Monica Chen and James Wang, who completed their Masters Degrees.

In January, the department welcomed Phillipa Williams and Hilary Seddon, who have been appointed Senior Academic Tutors. Both had already been in the department on fixed term contracts.

CONFERENCES, WORKSHOPS & VISITS

Richard Brown gave a talk entitled "A Direct Method for Correcting Errors in Orthogonal Matrices using Generalised Cayley Transforms" at the Computational Techniques and Applications Conference (CTAC2010) in Sydney from 29 November – 1 December 2010.

Qui Bui undertook a research visit to Prof. Lixin Yan at Zhongshan University, Guangzhou, China, from 1 – 22 December 2010, and was invited speaker at the International Conference on Harmonic Analysis and Applications at Macquarie University from 7 – 11 February 2011. His talk was entitled "Besov Spaces on Nondoubling Quasimetric Spaces".

Jeanette McLeod made a research visit to Brendan McKay at the Australian National University (ANU) Canberra from 6 – 11 December 2010 and attended the 34th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing (34ACCMCC). The conference was also attended by Günter Steinke who gave a talk entitled "On Kleinewillinghöfer types of Laguerre planes".

Michael Plank and Agate Ponder-Sutton attended the Australian and New Zealand Industrial and Applied Mathematics Conference (ANZIAM 2011) in Adelaide from 30 January to 3 February 2011. Both gave talks, Mike's was entitled "Free agents: non-lattice models of cell motility" and Agate's "A weed invades, and then what? Modelling with analysis".

Raazesh Sainudiin gave a talk entitled "Experiments with the site frequency spectrum" at the Bangalore Probability Seminar, Indian Statistical Institute, Bangalore, India on 15 December 2010. Raaz was invited by Pierre Del Moral, INRIA Research Director of Advanced Learning Evolutionary Algorithms (ALEA) Research Group in Bordeaux and Amandine Veber, CNRS Researcher at Centre for Mathematics and its Applications (CMAP), Ecole Polytechnique, Palaiseau, on a research visit to France from 29 January to 18 February 2011. Raaz is collaborating with the ALEA group on set-valued extensions of evolutionary algorithms and with Veber on statistical inference of spatial coalescent processes and particle filtering on graphs of coalescent experiments. He also gave an invited talk entitled "ABCDE – Approximate Bayesian Computation Done Exactly" at the Research Meeting on Random Models in Ecology, Genetics and

Charles Semple gave a talk entitled "Constructing a 3-tree for a 3-connected matroid" at a meeting

on Matroids and Computation at Victoria University, 29 November to 3 December 2010. He then contributed a talk "Submodular Functions and Optimizing Biodiversity" at the NZMS Colloquium in Dunedin from 6 – 10 December 2010. A number of postgraduates also attended the NZMS Colloquium.

Peter Renaud visited the Mathematics Department at the University of Caen, France, during January and gave two seminars entitled "Use and Abuse of Clifford Algebras in Physics and Engineering".

Douglas Bridges and Thomas Steinke attended the eighth International Conference on Computability and Complexity in Analysis (CCA 2011) at the University of Cape Town, South Africa, 31 January – 4 February 2011. Douglas presented a talk entitled "Weak-operator Continuous Linear Functionals", and Thomas gave a talk entitled "Constructive Notions of Compactness in Apartness Spaces". Douglas writes that this was his first visit to Africa and that in that time he managed to get bitten by bedbugs, catch (probably) giardia, and make contact with a distant cousin whom he last met when they were boys.

James Degnan, Charles Semple and Mike Steel presented talks at the Annual New Zealand Phylogenetics Meeting in Leigh from 6 – 11 February 2011. PhD student Joe Zhu was also at the meeting.

Maarten McKubre-Jordens attended the Mathematics and Statistics in Industry Study Group (MISG 2011), RMIT University in Melbourne, 6–11 February. He also visited Dr Zach Weber at the University of Melbourne, where he was furthering work in the paraconsistent foundations of Mathematics, working towards showing completeness of the real line using no consistency-reliant inferences, and developing further proof techniques for Mathematics in an inconsistency-tolerant logic. He also gave a 3-part workshop/seminar entitled "What Constructive Mathematicians Actually Do".

VISITORS

Erskine Fellow Warwick Tucker is visiting us from Uppsala University, Sweden, where he is currently Research Leader in the Department of Mathematics. His field of special interest is computer-aided proofs in analysis and parameter estimation. In 2004, Warwick was awarded a European Mathematical Society prize, which is awarded in recognition of distinguished contributions in Mathematics by young researchers not older than 35 years. He is hosted by Raaz Sainudiin.

Other recent visitors include: Felipe Voloch (University of Austin, Texas), Laszlo Szekely (University of South Carolina), Eva Czabarka (University of South Carolina), Vincent Moulton (University of East Anglia), Katharina Huber (University of East Anglia), Richard Laugesen (University of Illinois), Michael Floater (University of Oslo, Norway), Teodor Burghelea (University of Nantes, France), Tanja Stadler (ETH Zurich, Switzerland), Mary Myerscough (University of Sydney).

SEMINARS

Thomas Hangelbroek (Vanderbilt University, Nashville) "Approximation and Interpolation on Manifolds with Kernels".

Hui Huang (University of British Columbia, Vancouver) "Reconstructing images, surfaces and points".

Jan Saxl (University of Cambridge) "Variations on Themes of Frobenius and Burnside".

Alexander Danis (Uppsala University) "Parameter Estimation for Differential Equations by Rigorous and Non-rigorous Methods".

Robert Snocken (University of Southampton) "Representation theory of finitely generated nilpotent groups".

Teodor I. Burghelea (Universite de Nantes) "Complex fluids: complexity without imaginary part".

Mary Myerscough (University of Sydney) "Honeybee Demography: the vital role of foragers in maintaining colony populations".

Günter Steinke

INDUSTRIAL RESEARCH LIMITED

Kit Withers has been awarded a DSc from Auckland University, the first to be awarded in Mathematical Statistics. He will receive his degree on May 4th. The award was on the basis of 76 publications, mainly in mathematical statistics, with some on integral equations and other areas. These were evaluated by a committee under Peter Hall at ANU. Kit's current total of papers is running at 113.

Shaun Hendy was appointed Professor of Computational Physics in the School of Chemical and Physical Sciences at VUW in December. Shaun continues his joint role with IRL and VUW, with his time split equally between each institution.

Nicola Gaston has begun a regular slot as a chemist on Radio New Zealand Nights, with Brian Crump. She will be on air every few weeks on Thursday nights, at 8:45 pm. She has joined Shaun Hendy, who has been doing a 'Physics' session on the same show for the last year or so.

Dion O'Neale has been accepted as a Futureintech Ambassador. This is an IPENZ initiative, and involves promoting careers in science, technology and engineering to school students. http://www.futureintech.org.nz/.

A large group from applied maths attended the 5th Advanced Materials and Nanotechnology Conference (AMN-5) in Wellington from 8–11 February 2011. Aruna Awasthi, Bridget Ingham, Dion O'Neale, Nicola Gaston, Shaun Hendy, Dmitri Schebarchov, Krista Steenbergen, Graham Weir, Nat Lund, and Sione Paea all attended, along with Applied Maths visitors Bastien Lefevre, Doreen Mollenhauer and Amanda Parker. The conference covered a wealth of experimental and theoretical research focused on nanotechnologies and included keynote addresses from Nobel Laureate Professor Sir Anthony Leggett (Illinois), Professor Sir Richard Friend, (Cambridge), and Professor Neil Ashcroft (Cornell). According to inside sources, the event provided the opportunity for some wonderful science and networking as well as a wealth of fun, as the conference dinner dance floor saw nearly every member of the applied maths team boogying down for hours. Whirling physicists, chemists and mathematicians - don't worry, no one was hurt.

Krista Steenbergen and Amanda Parker both won prizes at AMN-5 — Krista for runner up for the best student talk, and Amanda won the Bluefern Prize for best computational poster.

Srikanth Dhondi, supervised by Shaun Hendy, has submitted his PhD thesis entitled "Numerical Simulations of Polymers at Nanoscale".

Dr Romaric Vincent from the Adolphe Merkel Institute in Fribourg, Switzerland visited in March and gave a talk entitled "The metallurgy of peanut butter". The talk made an analogy between work-hardening in metals, caused by defects in the crystal lattice, and work-hardening in an amorphous, glassy colloidal paste — peanut butter — due to shear transformation zones.

We also had a visit from Doreen Mollenhauer, from Berlin, who was back in New Zealand to attend the AMN-5 conference. She gave a talk: "Theoretical study of pyridine derivatives on a gold nanoparticle".

Warwick Kissling

MASSEY UNIVERSITY

INSTITUTE OF FUNDAMENTAL SCIENCES (MANAWATU)

Some re-organisation within the Institute of Fundamental Sciences means that we are now the Mathematics and Mathematical Physics Group, and have been joined by theoretical physicists Geoff Barnes, Fu-Guang Cao, and Tony Signal. Welcome, Geoff, Fu-Guang and Tony! The experimental physicists in the Institute now form part of the Chemistry and Biophysics Group.

Charles Little spent the second half of last year in Brazil, working with Marcelo de Carvalho at the Federal University of Mato Grosso do Sul, Campo Grande, Brazil. Their work generated enough material for three papers, one of which will be co-authored with Cláudio Lucchesi (University of Campinas). On their way to South America Charles and his wife Barbara met their first grandchild, in Auckland; and while there they were able to visit the remains of Charles' great-great-grandparents' homestead, outside Trelaw, Argentina. Their visit to Trelaw co-incided with the anniversary of the city's incorporation, with Charles' great-grandfather as founding president, and Charles was greatly moved by the welcome they were given.

Tammy Lynch traveled to Kaohsiung City, Taiwan in November to attend ISTP-21, the International Symposium on Transport Phenomena. She gave a talk titled "An introduction to the shock tube model for hydrothermal eruptions" (joint work with Luke Fullard) in the invited session on Transport Processes in Environmental Flows.

In December Robert McLachlan, postdoc Klas Modin, and PhD student Fleur McDonald went to Launceston, Tasmania, for the "Tasmanian Rigorous Analysis of Geometric Integrators Conference", or TRAGIC. It was a small meeting but had participants from 6 countries. Apart from the talks, a notable activity was teasing a Tasmanian wild hen by playing its "territorial dispute call" on an iPhone. Robert McLachlan has received funding for a 4-year research project, "CRiSP" (Collaborative Research in Structure Preservation — inexplicably, only half of the funded projects had cute acronyms, so don't get any ideas) linking Cambridge, Bergen, NTNU Trondheim, La Trobe, and Massey universities under the EU Marie Curie IRSES scheme, with co-funding from RSNZ.

Chris Tuffley and Ilya Chevyrev (University of Auckland) have been training and selecting the team for this year's IMO, to be held in Amsterdam in July. The team was announced earlier this month, and will consist of James Allen (Kristin School,

Auckland), Malcolm Granville (Auckland Grammar School, Auckland), Benedict Morrissey (Garin College, Nelson), Arun Shanmuganathan (Auckland International College, Auckland), Tom Yan (Auckland Grammar School, Auckland), and Robert Zhang (Auckland Grammar School, Auckland), with Ha Young Shin (Christchurch Boys' High School, Christchurch) as non-travelling reserve.

Sophie Pack successfully defended her thesis in November, and Luke Fullard is getting close to submitting his. Luke is also getting married over Easter weekend, to Judith Savage — congratulations, Luke!

SEMINARS

Yajuan Sun (Academy of Sciences, Beijing) "Energy-preserving numerical methods for multi-symplectic Hamiltonian systems".

Arnaud Brothier (Institut Mathématiques de Jussieu) "Solution to a question of Takesaki in the group case".

Robert McLachlan (Massey University) "Continuous and discrete conservation laws".

Bruce van Brunt (Massey University) "Probability Density Function Solutions to a Bessel Type Pantograph Equation".

Charles Little (Massey University) "Characterisations of PM-Compact Bipartite and Near-Bipartite Graphs".

THESES

Sophie Pack "Monotone iterates for nonlinear singularly perturbed convection-diffusion problems".

Christopher Tuffley

INSTITUTE OF INFORMATION AND MATHEMATICAL SCIENCES (ALBANY)

MATHEMATICS NEWS

Sophie Shamailov has joined IIMS as a part time research assistant and will work with Alona Ben-Tal for six months.

Over the summer, several of us attended the NZMS Colloquium in Dunedin during December (Alona, Tanya Evans, Carlo Laing, Gaven Martin, Robert McKibbin, Winston Sweatman, Graeme Wake), the NZIMA/NZMRI Summer Meeting on Dynamical Systems in Raglan in January (Alona, Carlo, Gaven), the ANZIAM meeting in Adelaide in January (Carlo, Joanne Mann, Mick Roberts, Winston, Graeme) and the Mathematics-in-Industry Study Group (MISG) in RMIT University at Melbourne in February (Barry McDonald, Winston, Graeme).

Mick Roberts writes: In January I travelled to Canberra to establish a collaboration with Geoff Mercer at ANU, and continued to the ANZIAM meeting in Adelaide. I will spend April 17 to May 21 at the program "Probability and Discrete Mathematics in Mathematical Biology" at the Institute for Mathematical Sciences, National University of Singapore. In the meantime, its teaching and administration.

In between attending the annual ANZIAM meeting in Adelaide in January and MISG in RMIT University at Melbourne, Graeme Wake toured the vast Eyre Peninsula in South Australia where many of his family emigrated from Somerset, England 100+ years ago, and where many Wake relatives still are involved in wheat farming: now a total of 40,000 hectares! At the end of March he will attend the first Malaysian Maths-in-Industry Study Group in Johor Nahru as an Invited Facilitator (the others all came from Oxford). In early April he will attend the Royal Golden Jubilee PhD congress in Pattaya, Thailand as an invited keynote speaker. During this visit he will attend Chanakarn Kiateramkul's PhD defence and give a seminar at KMITL University in Bangkok.

The future MISG-type activity in NZ is under discussion and the NZ Branch of ANZIAM is involved in this discussion. Activity of this type might resume here in 2013, in a way that is in synergy with the current very successful combined ANZ activity.

Graeme looks forward to attending the investiture of Emeritus Professor Roy Kerr at Government House with the well-deserved NZ Honour Companion of the NZ Order of Merit (CNZM) in mid-April. Graeme (along with Graham Weir) initiated the award of this honour (see the article elsewhere in this Newsletter).

Robert McKibbin and his student Amjad Ali both gave presentations at GeoNZ 2010 (a joint conference of the NZ Geothermal Workshop and the Geoscience Society of NZ) held in Auckland during November. Robert spoke on mathematical modelling of aerosol transport, while Amjad gave a talk about his PGDip Project on tracer transport in groundwater aquifers. Amjad has now started a PhD on modelling pollutant transport in unevenly-stratified groundwater aquifers.

Instead of his usual attendance at ANZIAM/MISG, Robert spent five weeks in February and March

visiting the Institute of Environmental Technology at Kanazawa University, Japan, to complete some current work on fluid, heat and pollution transport in groundwater aquifers, and working with Shigeo Kimura and his colleagues on modelling turbulence and dispersive transport in forest canopies. While there, Robert had discussions with Tetsuya Shintani from Tokyo Metropolitan University, where his group is trying to better model the way sediment is transported in one of the large domestic water supply lakes near Tokyo.

The severe earthquake and its aftermath fortunately did not affect Kanazawa directly. It happened 2 days before Robert was due to leave for home: "I felt the 'quake as I worked at my desk at the University, but only as a small motion - the real disaster was unfolding near Sendai, more than 400 km to the north-east."

The Mathematics group is involved in a revision of the BE programme at Massey. We contribute to the mathematics components of the degree, so are now beginning a wider review of our maths papers to see how they may be used more efficiently within the BE as well as other degree programmes.

STATISTICS NEWS

Marti Anderson writes: We are drying our eyes after learning the news that Marie Fitch will be leaving our group to take up a new position at University of Auckland. She is looking forward to new challenges working with our esteemed colleagues 'over the bridge', so renowned for their expertise in teaching statistics, which is certainly one of her passions. But oh how we will miss her!

Marti Anderson has moved from the Institute of Information and Mathematical Sciences (IIMS) over to the NZ Institute for Advanced Study (Gaven Martin's group) here at Massey Albany, which will provide excellent new research opportunities, while still allowing her to keep close ties with the stats group.

The up-shot of all these movements is that two new academic positions are now being advertised for Statisticians with the Albany group, so do take a look at the Massey Jobs website if you are keen to come and join us! (or contact Howard Edwards `h.edwards@massey.ac.nz`

Oliver Hannaford has successfully completed confirmation for his PhD, entitled "The effects of environmental heterogeneity on the evolutionary mechanisms and ecological patterns of biodiversity". Meanwhile, John Xie has now successfully completed his PhD thesis and is now off to greener (or at least soggier) pastures in Brisbane, Australia. His sparkle and enthusiasm will be sorely missed!

The summer has been filled with diving expeditions, as Adam Smith's PhD research, using the RV Poisson (our 4.3m rigid inflatable) develops in full swing. Adam is combining hands-on marine field work with Bayesian statistics to give us better models of the effects of marine reserves on fish communities. How much fun can one lot of statisticians have counting fish? We are pushing the boundaries on this one, along with colleagues David Raubenheimer (Institute of Natural Sciences) and Russell Millar (University of Auckland). Colleague Dr Mat Pawley is trying to beat us by having fun counting shellfish on beaches, having landed a new Ministry of Fisheries contract for the privilege. We think we saw him taking a surfboard along the last time he went sampling...

We recently hosted Dr Tim Langlois, a former PhD student of Marti's, who is now working as a postdoc with the Oceans Institute at the University of Western Australia. Tim came out for a dive with us and also gave us a couple of interesting seminars, outlining his current research on bio-geographical gradients in fish diversity along the Western Australia coastline.

Several international workshops in multivariate analysis, to be given by Marti Anderson, are in the cards for 2011 — in Portugal, the UK, New York, and Brisbane, which continues to provide a source of joy and new collaborative activities.

Beatrix Jones is currently on sabbatical, but just over the bridge (at UoA), which means we are fortunately able to continue to prevail upon her for her inputs into our research meetings (for research purposes only, mind!) This February Beatrix also took time out from a family trip to her hometown of East Lansing, Michigan, to give a talk entitled "Challenges in Gaussian Graphical Models" to the statistics department at Michigan State University. The talk went well, despite an audience well sprinkled with the parents of high school classmates!

Howard Edwards and Beatrix Jones (with a small amount of input from Marie) have been awarded an Ako Aotearoa grant to create a Data and Story library of datasets suitable for use in business Statistics courses. Before he left John Xie was employed to begin gathering data. Contributions of suitable datasets are welcome and can be emailed to `bizdatasets@massey.ac.nz` The resulting collection will be freely available online.

SEMINARS

Ken Hawick "Rock Paper Scissors Lizard Spock! — cycles, complexity and emergence in spatial game models".

Carlo Laing "Freezing noisy brain waves".

Marti Anderson, Shaun Cooper & Marie Fitch

UNIVERSITY OF OTAGO

DEPARTMENT OF MATHEMATICS AND STATISTICS

Our hearts go out to the people of Canterbury for the trauma they are going through and in particular our Canterbury University colleagues who are attempting to carry on as normally as possible but under the worst of conditions, e.g. giving lectures in marquees. Some Canterbury University students have chosen to come to Otago and these students have received help in securing suitable accommodation, as well as pastoral support appropriate to their circumstances. OUSA responded to a call from the University of Canterbury Students Association (UCSA) Volunteer Student Army and requested help from OU staff and the Dunedin community to provide lunch food for 1,000. The result was incredible and just over eight tonnes of goods poured in!

Hearty congratulations to Robert Aldred who has been promoted to Professor, the first personal Chair granted in this Department since Bryan Manly's in 1986. This was also the year that Robert came here to continue his PhD study with Derek Holton, the then new Professor of Pure Mathematics. The Department celebrated Robert's well-deserved achievement at a function on Friday 4 March.

The Department hosted a very successful meeting of the New Zealand Mathematical Society in December. The conference organizing committee was led by Peter Fenton. There were 117 participants and 91 contributed talks. The plenary speakers were: John Butcher (University of Auckland), Michael Eastwood (Australian National University), Andre Nies (University of Auckland), Jacqui Ramagge (University of Wollongong) and Hamish Spencer (University of Otago).

Congratulations to Mihály (Misi) Kovács is this year's recipient of the NZ Mathematical Society "Early Career Award for Mathematical Research". Misi's citation for the prize reads "for his innovative research in the field of stochastic partial differential equations, particularly their numerical approximation".

We welcomed David Bryant way back in July and Jörg Hennig in February as permanent academic staff members (see New Colleagues section) and Postdoctoral Fellows, Jessica Leigh and Steffen Kla-ere (working with David Bryant) from November 2010.

Two staff members left in December. Laimonis Kavalieris has resigned to form his own statistics consulting company, "MAD". After 24 years, Laimonis has served on many committees and made a significant contribution to the Statistics group in the Department. His extensive knowledge of wines will be especially missed by everyone who enjoys the social club's wine tasting evenings.

Peter Dillingham also resigned to further his career in the USA. Peter was here a relatively short time (by our usual standards) but will be especially missed by David Fletcher who supervised his PhD and continued research collaboration with him after that. This work will continue however. Our best wishes go to both Laimonis and Peter.

In November Boris Baeumer gave a talk at the Department of Statistics and Probability at Michigan State University entitled "Approximating tempered operator stable random variables", followed by a talk at the Department of Geosciences at Virginia Tech entitled "Fractional Dispersion in Geologic Systems", topped off by an invited talk at the INFORMS 2010 Annual Meeting in Austin, Texas, also on "Approximating tempered operator stable random variables".

VISITORS

The Department has hosted many research visitors over the summer: Prof. Gonzalo Aranda Pino (University of Malaga), Dr Nathan Brownlowe (University of Wollongong), Dr Lisa Clark (Susquehanna University), Prof. Magnus Landstad (Norwegian University of Science and Technology), Dr Eduard Ortega (Norwegian University of Science and Technology), Prof. Jacqui Ramagge (University of Wollongong), Dr Aidan Sims (University of Wollongong), Dr Michael Whittaker (University of Wollongong), Dr Paulette Willis (University of Houston), Prof Dana Williams (Dartmouth College), Dr Markhus Neuhäuser, RheinAhrCampus, Remagen, Germany) and Dr Matthew Schofield (University of Kentucky).

SEMINARS

Steffen Klaere "Phylogenetic diversity and its application to biodiversity conservation".

Matthew Spencer (Department of Environmental Sciences, University of Liverpool) "Semi-parametric models for coral reef dynamics: investigating the evidence for alternative stable states".

Markus Neuhäuser (RheinAhr Campus, Remagen, Germany) "Good practice in testing for an association in contingency tables".

Nathan Brownlowe (University of Wollongong) " The C*-algebras of irreversible dynamical systems, and applications to directed graphs".

Michael Whittaker (University of Wollongong) "Tiling dynamical systems as an introduction to Smale spaces".

Lisa Clark (Susquehanna University, Pennsylvania) "Algebras Associated to Groupoids"

Avi Berman (Technion-Israel Institute of Technology, Haifa, Israel), "Completely Positive Matrices".

Hamish Spencer (Department of Zoology) "Identifying cliques of convergent characters: an example from the evolution of cormorants and shags".

Jonathan Brown "The Rohklin property and classification of crossed product C*-algebras".

Lenette Grant

UNIVERSITY OF WAIKATO

DEPARTMENT OF MATHEMATICS

Kevin Broughan has recently announced to the Department that he will be retiring in the middle of the year. We wish him well in his retirement. However, his services to the Department will not be entirely lost as he will still be involved in research and in some teaching at graduate level.

As a consequence of Kevin's retirement and an expected staffing change coming up, as well as the healthy state of student numbers, the Department is expecting to advertise for two positions shortly; one broadly in the area of pure mathematics and one broadly in the area of applied mathematics.

Kevin attended the Devonport Topology Festival in February. He presented a talk titled "Meromorphic flows and limit cycles". He also attended the NZMS Colloquium last December where he presented a talk titled "Some recent advances on the perfect number problem". Also attending the NZMS Colloquium were Stephen Joe and Ernie Kalnins. Stephen gave a talk titled "Sobol′ sequences with good two-dimensional projections" while Ernie gave a talk titled "Quantum superintegrability on Euclidean space".

Ernie attended the NZMRI Summer meeting on Dynamical Systems held in Raglan. His former post-doc, Jonathan Kress from the University of New South Wales, visited for a week in January. Another visitor was Marcel Jackson from La Trobe University who worked with Tim Stokes for two weeks in February.

Tim Stokes and Yuri Litvinenko have finished their travels for which details were given in last December's column. Last December, Ian Craig made a private visit to the UK where he made use of the opportunity to meet up with some collaborators and give a few talks.

The Department is currently at full strength as there is nobody on study leave this semester. In fact, the Department is at more than full strength as we have Keith Allen and Muni Reddy shouldering some of our teaching load.

SEMINARS

P. Kritzer (University of Linz) "Uniformly distributed point sets and their application to quasi-Monte Carlo algorithms".

M. Jackson (La Trobe University) "Constraint satisfaction problems and universal algebra".

Stephen Joe

FORMAL METHODS GROUP, DEPARTMENT OF COMPUTER SCIENCE

Since 1999, the Formal Methods Group in the Department of Computer Science has been researching the mathematics of finite-state and infinite-state models of process behaviour.

Prof. Jonathan Bowen from London South Bank University visited us in November 2010. He is a well-known Formal Methods researcher, and has established and maintained the Formal Method Wiki (`http://formalmethods.wikia.com/wiki/Formal_methods`) for a long time.

During his sabbatical, Prof. Steve Reeves returned the visit in March 2011 to continue work on Community of Practice for Formal Methods. Steve will also give seminars at University College London and Queen Mary College at the University of London, and he will attend the ACM EICS Conference and the FM 2011 Conference, where he and Judy Bowen from Waikato will co-chair the FMIS 2011 Workshop.

In November and December 2010, there were also two visitors from Chalmers University of Technology in Gothenburg, Sweden. Prof. Martin Fabian, who is a well-known researcher in supervisory control theory of discrete event systems, visited to

coordinate the development of the Waters/Supremica modelling and verification software (http:/www.supremica.org), which is co-developed at Chalmers and Waikato. Martin Fabian's PhD student Sahar Mohajerani spent seven weeks at Waikato, during which we were able to develop several new results in her research topic of compositional synthesis of discrete event systems.

In January 2011, Simon Ware, a PhD student of the Formal Methods Group, attended "Computing: The Australasian Theory Symposium", where he presented a paper on his PhD research.

Seminars

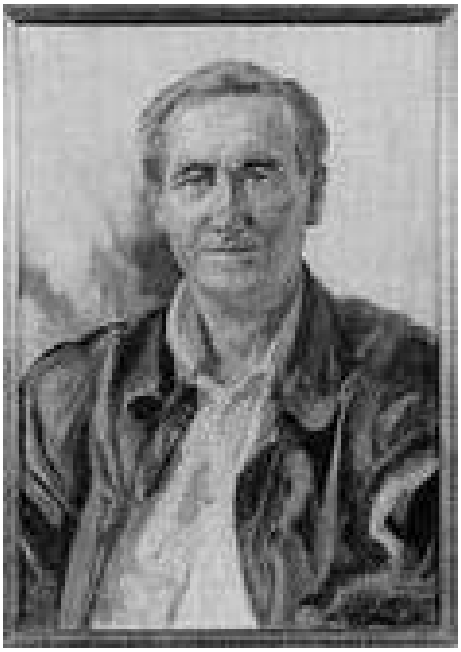
J. Bowen (London South Bank University / University of Westminster / Museophile Limited) "Wikis and museums".

J. Bowen (London South Bank University / University of Westminster / Museophile Limited) "The industrial use of Formal Methods: Experiences of an optimist".

M. Fabian (Chalmers University of Technology) "On solving large scale supervisory control problems".

Robi Malik

PROFESSOR EMERITUS ROY KERR GAINS NEW ZEALAND HONOUR



In the 2011 New Years Honours list our distinguished colleague was given the award of Companion of the NZ Order of Merit (CNZM) for his services to Astrophysics. This was for his work in the theory of rotating black holes, in the 1960s and later. This very high recognition results from his discovery of the exact solution of Einstein's equations for a rotating black hole. Subsequently, the Kerr solution was shown to be the only possible solution for these astrophysical phenomena. Consequently, his theoretical discovery is the basis for almost all research in astrophysics today. Indeed, the Kerr solution has been described by many as "the most important exact solution to any equation in physics".

Well-known astrophysicist Stephen Hawking, in his bestselling book A Brief History of Time, describes the uniqueness of the Kerr solution. "In 1963, Roy Kerr, a New Zealander, found a set of solutions of the equations of general relativity that described rotating black holes. These "Kerr" black holes rotate at a constant rate, their size and shape depending only on their mass and rate of rotation. If the rotation is zero, the black hole is perfectly round and the solution is identical to the Schwarzschild solution. If the rotation is non-zero, the black hole bulges outward near its equator (just as the earth or the sun bulge due to their rotation), and the faster it rotates, the more it bulges". So, to extend Israel's result to include rotating bodies, it was conjectured that any rotating body that collapsed to form a black hole would eventually settle down to a stationary state described by the Kerr solution... [Subsequent research showed] that this conjecture had to be correct: such a black hole had indeed to be the Kerr solution."

The Kerr solution, using what is now known as the Kerr metric, correctly and elegantly describes how space-time behaves in the four dimensional world about massive objects, such as steadily rotating stars or black holes. Such black holes are described by only their mass and angular momentum. This great mathematical simplicity reveals a deep and surprising simplicity in Nature regarding such important objects. Professor Andy Fabian, OBE, FRS, points out that recent research proves that large black holes "define the final mass of virtually all galaxies through a feedback action of their own output. Kerr black holes thereby play a defining role in producing the Universe we see around us." His historic paper published in Physics Letters A has been cited an amazing number of 767 times (up to 2009).

Professor Kerr was born and educated in NZ, entering immediately into year 3 at the University of Canterbury direct from school (St Andrews College), in 1951. He subsequently gained his PhD in 1959 from the University of Cambridge, and held appointments in the US before returning to NZ in 1971 as Professor of Applied Mathematics at his Alma Mater, the University of Canterbury. He became Head of the Department of Mathematics and Statistics in 1983, Today he is an Emeritus Professor at the University of Canterbury, and continues to be active in his research, both here and overseas (mostly in Italy). Expert referees involved are very much from a famous list of "Who's Who" in Astrophysics: Sir Roger Penrose of Oxford, Professor A.C. Fabian of Cambridge, and Professor Fulvio Melia of Arizona. The last of these has recently published a book entitled "Cracking the Einstein Code," in October, 2009, by the University of Chicago Press which is essentially a biography of Roy. It is highly recommended as a good read. We note he is very much at the top of this distinguished list and are glad that New Zealand (at last) has recognised the star amongst us. Your colleagues warmly congratulate him on this award.

Graeme Wake, Massey University Auckland
Graham Weir, Industrial Research Ltd, Wellington.

NEW COLLEAGUES

JÖRG HENNIG

Jörg Hennig joined the Department of Mathematics and Statistics at the University of Otago as Lecturer in Applied Mathematics in February this year. Jörg has been living in Potsdam, Germany, for the past four years, where he was a post-doctoral fellow at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute). Prior to that he was a student and a Ph.D. student at the University of Jena, Germany. Jörg's research is concerned with analytical and numerical relativity and with the numerical solution of PDEs. As part of this subject he is interested in relativistic equilibrium configurations and in cosmological spacetimes.

DAVID BRYANT

David Bryant is a mathematician and statistician working on the development and application of models, methods and theory in evolutionary biology. He is the co-author of Neighbor-Net and the SplitsTree software package, the most widely used phylogenetic network tools. Bryant's work has been applied to problems in phylogenetics and population genetics where conventional tree-based models break down. He has recently been investigating appropriate theoretical frameworks for linguistic and cultural trait evolution.

David completed his Ph.D. in 1997 under the supervision of Mike Steel at the University of Canterbury. He was a postdoctoral fellow with David Sankoff (Université de Montréal) and Oliviér Gascuel (Montpellier, France) before taking up a joint mathematics and computer science position at McGill University, Montreal. After obtaining tenure in 2005, Bryant moved to University of Auckland, shifting to Otago in July, 2010.

URBAN SEARCH AND RESCUE TEAM IN CHRISTCHURCH

The Mayor of Christchurch Bob Parker thanks members of the USAR team NZRT5. From left to right are Anna Roback (partly obscured), Elizabeth Mead, Philip Sharp, Graham Tilsley, Kane Flemming and Stephen Wilson.

Philip Sharp, Senior Lecturer of Mathematics at the University of Auckland, is a member of NZRT5. That is a volunteer initial-response team based on Auckland North Shore, which operates through Civil Defence and is trained in urban search and rescue (USAR). This group, together with NZRT3, Auckland's only other initial-response team, were put on standby three hours after the Christchurch earthquake (magnitude 6.3) on Tuesday February 22, and both were deployed the next day. Philip tells of the experience.

CIVIL DEFENCE WORK IN CHRISTCHURCH

Five of our team members left Auckland at 5am Wednesday 23 with two vehicles and trailers containing our rescue equipment, food and 600 litres of water. The remaining 17 members were scheduled to fly to Christchurch on an RNZAF flight. We had hoped to fly on Wednesday morning but did not depart Whenuapai until 5pm: no earlier flight was possible because the planes were required to transport injured people and critical equipment.

That deployment of 22 team members and the two rescue vehicles meant that Auckland was without much of its Civil Defence USAR resources. Fortunately, rural fire service teams were available, should an emergency arise.

We spent Wednesday night sleeping on the floor of the Burnside Rugby Club, which was palatial accommodation compared with that for some locals. The five who drove to Christchurch arrived 5am on Thursday 24 and began a mandatory 9-hour stand-down. The rest reported to Latimer Square at 8am for the day's task, but did not receive it until 1pm. That five-hour delay was frustrating, but it reflected the complexity of the situation. Our task was to go door-to-door in one of the worst affected suburbs, and check whether each house was fit to be lived in and how the residents were coping. We also had the

role of talking with the public and attempting to answer their questions, the most common of which was "When will we get our water and power back?".

Most residents were managing alright, but there were exceptions. One person had just two cans of food which she planned to eat raw, and a bucket of water. She was low on medicine and had no family to call on, but I quickly found a neighbour to help her. Another person felt uncomfortable staying in her house, but did not want to leave because the back door would not close. A neighbour rang her handyman, and he arrived 15 minutes later.

We returned to Latimer Square just after 6pm and had something to eat. Our team was then tasked to help re-organize the tents and parking at Latimer Square. We finished after 9pm and drove to Rimu Scout Camp, 16km west of Latimer Square. That camp was to be our home for the next five nights. Several members of the team had gone ahead and starting pitching our tents. We completed the pitching and climbed into our sleeping bags around 11pm. About 100 Civil Defence USAR personnel stayed at that scout camp.

We were back at Latimer Square 7:30am the next day (Friday February 25), and our tasking was the same as the previous day. The day went smoothly and there were some pleasant surprises. I had just come out of a house when a car pulled up and the passenger held a plate out the window and asked "Do you want some home baking?". I naturally said yes. When the teams arrived back at the scout camp, we found a table in the kitchen buckling under the weight of home baking and a sign saying "Go Civil Defence". The support from the people of Christchurch was overwhelming at times.

On Saturday February 26 I escorted two structural engineers around two areas within the cordon. The first area was near the Avon River, the second was a block in the Central Business District, including part of Cashel and Hereford Streets. The engineers performed an external check of each building, and they classified each as green (safe), yellow (restricted entry), or red (no entry). Some buildings were sound but they were classified red, because the building next door was red and might fall on them. Sadly, only one building in that CBD block received a green classification.

As we were driving between the two areas, we had to go through a checkpoint. When we arrived a couple were talking to a constable at the checkpoint. They saw us and rushed over. Their house was within the cordon and they needed to get their passports for a trip to Japan, but the constable would not permit them to enter the house unless they were escorted by Civil Defence people. One of the structural engineers and I escorted the couple to the house, and we found that it was not classified red. As I expected, the couple took the opportunity to grab one or two other items besides their passports. By the time the couple left they had five bags: I did not begrudge them the extra time.

Sunday and Monday were spent doing detailed searches of areas just inside the cordon. The goal of that searching was to determine areas that contained no person or body. One consequence of this goal was that we had to search every space that could hold a small child. Those spaces included cupboards, refrigerators, rubbish tins and those under beds. If a building, shed or large box was locked and the key was not readily available, then we had to force entry. If we forced entry into a building, the constable assigned to our team recorded the details and we had to make the building watertight before we left. We were well-prepared for the forced entries. We had a sledge-hammer, a crow-bar, a flat bar, an extension ladder, and a battery-powered drill. Whenever possible, we forced an entry that did not cause damage. More than once we used the ladder to climb in through an upstairs window. Three of use opened a locked, cantilevered garage door with two hedge clippers and brute force, without doing any damage. Another time, the flex in a cantilever garage door was enough to enable a smallish team member to gain entry into the garage and then into the house, using the internal entry from the garage.

The next day (Tuesday March 1) we flew with 65 civilians back to Whenuapai on a Hercules. On arrival, we had our first post-deployment debriefing, the main purpose of which was to permit us to let off steam and to tell us that counselling was available. We were then encouraged to take two days rest. That rest was compulsory for team members who worked for Auckland City Council.

I was very well-supported by my colleagues at the University of Auckland during and after the deployment, and I thank them for that support.

Philip Sharp
Garry Tee

CONFERENCES

STUDENT TRAVEL GRANT REPORTS

ANZIAM CONFERENCE AND MISG 2011

Recipient: Luke Fullard (Massey University at Palmerston North).

ANZIAM 2011 was this year held at the Stamford Grand Hotel, Glenelg, South Australia. While more northern parts of the country were experiencing flooding and tropical cyclones, the south was searing in 42^oC heat which was testing even the most acclimated local.

The conference talks were 'hot' as well! Excellent plenary sessions were followed by equally good talks with subjects ranging from optimising the placement of passing bays in an underground mine to the biological treatment of wastewater to the dynamics of convection in a box of porous media. Of particular note were excellent talks by John Sader (University of Melbourne) on the dynamics of nanomechanical devices in fluids, and Darren Crowdy (Imperial College London) on solving problems in multiply connected domains.

Continuing the theme of applied mathematics, the following week I attended MISG 2011 at RMIT University, Melbourne, whose weather was much more Palmerston North like! The particular problem for which I was a student moderator was proposed by NZ Steel, Auckland, and challenged us to increase vanadium recovery during steel manufacturing from iron sands.

A liquid iron bath is oxidised by blowing gaseous O_2 onto the bath surface, or by adding a solid millscale powder. The oxygen then reacts with vanadium and other elements in the iron bath to form a slag which floats on the top of the bath. This can then be removed and taken for processing. The challenge for the 16-strong group, led by Prof. Graeme Wake and Dr. Winston Sweatman, was to maximise the amount of vanadium recovered while avoiding a 'carbon boil' situation where a combination of high temperature and too much production of CO results in a lava like mess on the factory floor.

Throughout the course of the week many intense and in depth discussions were had about the specific form of the modelling equations, but by the end of the time we had come up with an appropriate model, the preliminary numerical results of which look promising and seemed to please the NZ Steel representatives.

I would like to sincerely thank the NZMS, ANZIAM, and the Postgraduate Travel Fund, IFS, Palmerston North for critical funding to attend these two applied mathematics meetings. The contacts made at both ANZIAM 2011 and MISG 2011, along with the invaluable experience of moderating a problem are priceless and greatly appreciated.

MISG 2011, RMIT MELBOURNE, AUSTRALIA

Recipient: Nurul Syaza Abdul Latif.

This is the second Mathematics and Statistics Industry Study Group (MISG) I have attended. For this year MISG, there were five industry problems proposed but the NZ Steel case study really caught my eyes. In New Zealand, the production of steel is minimal on a world scale, being less than 1% the output of the major producing countries. However, the production of steel in New Zealand is unusual as it was produced from iron sand, making the overall process almost unique and New Zealand is one of the few countries that has increased steel production over the last decade.

NZ Steel would like to optimise the recovery of Vanadium during steel manufacturing process so that the steel becomes stronger, harder, tougher, and more durable. The liquid iron reacting with the oxygen from the O_2 blower nozzle on the surface of the bath formed a slag that contains Vanadium and some other metalloids. Currently only 67% of Vanadium recovered from the slag. This needs to be improved and the constraint during this process is that we need to avoid carbon boil and minimise the carbon loss. The chemical reactions that occurred during this process are far more complicated that it was thought. It requires a careful assessment so it will be consistent with the chemistry kinetics. With Prof. Graeme Wake and Dr. Winston Sweatman as the moderators and other great team members, the group came up with a more realistic model that represents this reaction. It was a nine-equations dynamical system with almost 30 constants overall. I did become involved with the "search-the-constants-value" team. Although it sounds like an easy task, I can say it was a tough one, as we needed to search through and read a few articles just to find the values of the constants that represent the chemical reactions in iron making. The constants are going to be needed so that the model can show how the process can be improved to increase the Vanadium recovery.

At the end of the MISG week, Prof. Wake and Luke Fullard did the summary presentation. Prof. Wake suggested that this project could be extended to the control problem using Pontryagin Method.

INTERNATIONAL CONFERENCE ON EVOLUTION EQUATIONS (11–15 OCTOBER 2010, SCHMITTEN, GERMANY)

Recipient: Manfred Sauter (University of Auckland)

In October 2010, I was fortunate to be able to attend the International Conference on Evolution Equations. It was held in honour of the 60th birthdays of Wolfgang Arendt, Jan Prüß and Lutz Weis in the small township of Schmitten, a health resort in Germany's low mountain range Taunus.

The conference attracted an agglomeration of outstanding international researchers and distinguished speakers, a great many of them major contributors to the field. Most of them were friends and scientific collaborators of at least one of the birthday boys, but often they knew all three of them.

Regarding myself, Wolfgang Arendt was my supervisor during my time in Ulm, and I had also met the other two at several occasions before. Due to the high number of 122 participants, myself and most of the many younger mathematicians were accommodated outside of the conference centre in Schmitten itself. The conference centre was in walking distance tucked away in the surrounding forest.

The program was tight with the main speakers during the morning session, and then two streams of shorter talks filling the afternoon session. As it was not possible to provide everybody with the opportunity to give a talk, the organisers incorporated a well-received poster session so that every participant had the chance to present some of their work.

The atmosphere was infused with friendship and was relaxed and stimulating. In the breaks and during the meals there was always a lively discussion, and the questions raised after a talk often enough resulted in a group of experts putting their heads together afterwards. Interestingly, on the first evening we by chance managed to have a trans-Tasman dinner table, with Derek Robinson, Alan McIntosh, Tom ter Elst, Daniel Daners and myself sitting at the same table. Sadly there was a tragic event overshadowing the conference. Nigel Kalton, one of scheduled main speakers, had passed away on 31 August 2010. In his time slot friends held a session in memoriam of the great mathematician he was.

I presented a poster on "The form method for m-acretive operators" which contained work in progress joint with Hendrik Vogt and my supervisor Tom ter Elst. Both the talks and the feedback to the poster presentation have provided valuable input for my thesis-related research.

I would like to sincerely thank the New Zealand Mathematical Society for supporting this conference visit that also gave me the opportunity to visit my former colleagues and friends at the University of Ulm. More information about the conference, the speakers and their talks can be found on the following website: http://www.mathematik.tu-darmstadt.de/~evo2010/.

THE NZMS COLLOQUIUM 2010: A STUDENT'S PERSPECTIVE

To the mathematician, the NZMS Colloquium is a fantastic opportunity to engage with others of his calling, learn about the latest developments in a variety of fields and generally immerse himself in a fellowship of ideas. For the student freshly departed from the calm waters of an Honours degree into the stormy high seas of research, the Colloquium is perhaps as much an exercise in trying not to drown as in learning to swim. Fortunately, several of the talks had titles containing words that I'd seen before. However, over the course of the Colloquium, I was surprised to find that the nature of the speaker, rather than my familiarity with the material being presented, was the deciding factor in whether I sank or managed some variety of doggy-paddle.

A good example of this was Dr Ben Whale's talk entitled, "Functional Definitions of Lorentzian Distance for Noncommutative Geometry". Despite the intimidating title, Ben's talk was both engaging and, more surprisingly, accessible. While listening to the talk, it occurred to me how difficult it must be to pitch such a talk correctly. Adequately conveying the depth and importance of material that is advanced by anyone's measure, while also remaining accessible to someone with only an undergraduate exposure to mathematics, is surely no mean feat. As a consequence, listeners of all levels were able to leave the room a little bit more knowledgeable, rather than simply more confused. Ben's talk was important for me, because it showed that the expanse between my understanding and that of the many intellectual titans in attendance, while large, is traversable. At least in theory.

From a student's perspective, this is the real lesson to be taken from the Colloquium. The sheer variety of research being undertaken in mathematics is not only astonishing but also, for the student, intimidating. The realisation that there are vast areas of my chosen discipline, about which I will never understand much more than I do today, is daunting. The knowledge that it is indeed possible, at least in theory, to someday stand as an equal amongst men and women of learning is encouraging. The prospect of frightening some poor student with an intimidating title of my own is downright exciting.

However, perhaps the best part of the Colloquium is meeting dozens of people who know that the question, "What's green and commutes?" is correctly answered, "an abelian grape".

Many thanks to the speakers whose talks both challenged and enlightened me, and to the organisers of the Colloquium for the opportunity to peer a little deeper into the world of mathematics.

Christopher Laing

THE INTERNATIONAL CONGRESS OF MATHEMATICIANS, 2010, HYDERABAD, INDIA

1. SOME HISTORICAL DATA (SOURCE: WIKIPEDIA).

The first, rather small, ICM took place in Zürich in 1897. During the 1900 ICM in Paris, David Hilbert announced his famous list of 23 unsolved mathematical problems. At the 1904 ICM in Heidelberg, Gyula König delivered a lecture where he claimed that Cantor's famous Continuum Hypothesis was false. An error in König's proof was discovered by Ernst Zermelo soon thereafter.

The 1924 congress in Toronto was organized by John Charles Fields, the initiator of the Fields Medal; it included a roundtrip railroad excursion to Vancouver and a ferry ride to Victoria. The first two Fields Medals were awarded at the 1936 ICM in Oslo.

Recent ICMs were located in: Berlin, 1998; Beijing, 2002; Madrid, 2006. The next one will be in Seoul, 2014.

2. SOME FACTS ON THE 2010 ICM.

It was located in Hyderabad, India, a city known for its high-tech industry, and in particular software companies such as Infosys. The part of the city where the congress center and all these companies are is seriously called Cyberabad!

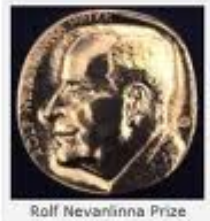
All ICM's are organized by the IMU, with the help of local people, in this case number theorist S. Ragunathan (Tata institute for Fundamental Science in Mumbai) and others. Satellite meetings in the topic of the special sections take place before the congress. They are sponsored by the IMU. I went to the one on logic, which was located in Chennai (Madras).

3. PRIZES

The four 2010 fields medalists are: Elon Lindenstrauss (Hebrew University), ergodic theory; Ngo Bao Chau (Orsay, born in Viet Nam), geometry; Stanislaw Smirnov (Geneva), statistical physics; Cédric Villani (Inst. Henri Poincare/ IHES, Paris), mathematical physics. Besides being smart, you also have to be under 40. Notably, 3 Fields medalists from a French speaking University.

Four further prizes were given: the Nevanlinna prize, for mathematics applied to computer science, which went to Dan Spielman (Yale); the Gauss, Chern (new), and Abel prize.


Fields Medal


Rolf Nevanlinna Prize


Carl Friedrich Gauss Prize for Applications of Mathematics


Chern Medal

4. PARTICIPANTS

Besides the prize winners, who all gave plenary talks, there were 20 further plenary speakers. There were 20 sectionals of four—nine talks each, with ca. 140 speakers in total. The largest number of speakers was from the US.

There were over 3000 delegates (including the speakers). Seven delegates are based in NZ: Bill Barton, Kevin Brougham, Robert Goldblatt, Gaven Martin, Robert McLachlan, Andre Nies, Sunanda Dixit. I gave a talk in the logic section, which is the smallest with only 4 talks.

5. STRUCTURE OF THE CONGRESS

There were 8 days of lectures, with one day off after the first four days. Typically, the plenary events took place 9am – 2:45 pm; sectionals, short communications, and panel discussions 3pm–6pm; entertainment and fun (of sorts) was provided in the evening. The prize winner plenary lectures were spread over the whole congress.

The first day consisted of a welcome by Prof. Lovasz, President of IMU, Prof. Groetschel, the Secretary of the IMU, and the President of India, Pratibha Pratil. Her excellency President Pratil awarded the Fields medals and the Nevanlinna prize. Laudationes on Fields medalists and Nevanlinna prize winner were given (30 min each). For instance, Furstenberg started out with the one on Lindenstrauss. Unfortunately, only the one on the Nevanlinna prize was comprehensible. For some more (critical) information, see the blog by Prof. Tim Gowers.

6. LIST OF SPECIAL SESSIONS

Logic and Foundations, Algebra, Number Theory, Algebraic and Complex Geometry, Geometry, Topology, Lie Theory and Generalizations, Analysis, Functional Analysis and Applications, Dynamical Systems and Ordinary Differential Equations, Partial Differential Equations, Mathematical Physics, Probability and Statistics, Combinatorics, Mathematical Aspects of Computer Science, Numerical Analysis and Scientific Computing, Control Theory and Optimization, Mathematics in Science and Technology, Mathematics Education and Popularization of Mathematics, and the History of Mathematics.

7. THE FUN STUFF!

There were concerts and dance performances bringing participants closer to Indian music. A huge banquet was held on Day 3 and on Day 2 there was a much smaller dinner for the invited speakers.

There was also a play called "A disappearing number", which was on the life of S. Ramanujan, and staged by a British Theatre troupe. It was based on Hardy's book. This play had quite amazing visual effects.

As well as this there was simultaneous chess with world champion Vishi Anand, two lectures on classical music in India and a lecture by Simon Singh.

Andre Nies

NOTICES

NEW ZEALAND MATHEMATICS COLLOQUIUM 2011

JOINTLY HOSTED BY THE UNIVERSITY OF AUCKLAND
AND AUT UNIVERSITY
6 –8 DECEMBER, 2011
VENUE: ENGINEERING SCHOOL, UNIVERSITY OF AUCKLAND

PLENARY SPEAKERS:

- John Mason (Open University) "Making Connections: shadows, crossed ladders, couriers, Ceva and parallel sums"
- Kiran Kedlaya (San Diego/MIT) (Number theory/Algebraic geometry)
- Graeme Wake (Albany) ANZIAM Lecturer
- Alan McIntosh (ANU) (Harmonic Analysis/PDEs)
- Charles Semple (Canterbury) NZMS Research Award winner
- Hinke Osinga (Auckland) (Dynamical systems)

PROVISIONAL SCHEDULE:

Monday 5th:

5:00-7:00	Registration and Reception

Tuesday 6th:

8:30-9:00	Registration
9:00-10:10	Welcome and Plenary lecture
10:40-12:10	Parallel sessions
12:10-1:30	Lunch and math HoDs meeting
1:30-5:00	Plenary talk and parallel sessions
5:00-6:00	Colloquium and NZMS AGM
6:00-8:00	Poster session and reception

Wednesday 7th

9:10-10:05	Plenary lecture
10:30-12:30	Parallel sessions
12:30-1:30	Lunch and ANZIAM AGM
1:30-3:30	Plenary talk and parallel sessions
3:30-6:30	Free time
6:30–11:00	Drinks and Dinner at Tamaki Yacht Club

Thursday 8th

9:10-10:05	Plenary lecture
10:30-12:30	Parallel sessions
12:30-1:30	Lunch
1:30-3:30	Plenary talk and parallel sessions
3:30-3:35	Conference close.

REGISTRATION FEES:

NZMS non-member/late registration	$320
NZMS member	$270
Student	$160

DEADLINE FOR SUBMISSION OF ABSTRACTS FOR TALKS: Friday October 21, 2011.

CONTACT: Steven Galbraith, Mathematics Department, University of Auckland.

NOMINATIONS FOR THE 2011 NZMS RESEARCH AWARD

This annual award was instituted in 1990 to foster mathematical research in New Zealand and to recognise excellence in research carried out by New Zealand mathematicians. Recipients to date have been John Butcher and Rob Goldblatt (1991), Rod Downey and Vernon Squire (1992), Marston Conder (1993), Gaven Martin (1994), Vladimir Pestov and Neil Watson (1995), Mavina Vamanamurthy and Geoff Whittle (1996), Peter Lorimer (1997), Jianbei An (1998), Mike Steel (1999), Graham Weir (2000), Warren Moors (2001), Bakhadyr Khoussainov (2002), Rod Gover (2003), Eamonn O'Brien (2004), James Sneyd and Robert McLachlan (2005), Mick Roberts and Robert Aldred (2006), Ernie Kalnins (2007), Mike Hendy (2008), André Nies (2009) and Charles Semple (2010).

CALL FOR NOMINATIONS

Applications and nominations are invited for the NZMS Research Award for 2011. This award will be based on mathematical research published in books or recognised journals within the last five calendar years: 2006 – 2010.

Candidates must have been residents of New Zealand for the last three years. Nominations and applications should include the following:

- Name and affiliation of candidate
- Statement of general area of research
- Names of two persons willing to act as referees
- A list of books and/or research articles published within the last five calendar years: 2006 – 2010
- Two copies of each of the five most significant publications selected from the list above
- A clear statement of how much of any joint work is due to the candidate

A judging panel of three people shall be appointed by the NZMS Council. The judges may call for reports from the nominated referees and/or obtain whatever additional referee reports they feel necessary. The judges may recommend one or more people for the award, or that no award be made. No person shall receive the award more than once. The award consists of a certificate including an appropriate citation of the awardee's work, and will be presented (if at all possible) at the New Zealand Mathematical Society Colloquium Dinner in 2011.

All nominations (which no longer need to include the written consent of the candidate) and applications, should be sent by 15 July 2011 to the NZMS President:

Professor Charles Semple,
Department of Mathematics and Statistics,
University of Canterbury,
Private Bag 4800,
Christchurch 8140,
New Zealand.

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

NOMINATIONS FOR THE 2011 NZMS EARLY CAREER AWARD

This award was instituted in 2006 for early career New Zealand mathematicians. Recipients to date have been Noam Greenberg and Catherine McCartin (2007), Barbara Holland (2008), Stephen Marsland (2009) and Mihály Kovács (2010).

CALL FOR NOMINATIONS

Applications and nominations are invited for the NZMS Early Career Award for 2011. Criteria for eligibility are the same as for the Marsden fast start grants. Essentially, this means that applicants must be within seven years of confirmation of PhD with an allowance made for extenuating circumstances. The candidate will be judged on their three best papers and a two-page CV. The papers should be published or in press. In cases of joint authorship, a clear statement of the mathematical contribution of the candidate should be made. The candidate will have completed a significant part of their research within NZ. They would also normally be expected to be a member of the NZMS.

A judging panel shall be appointed by the NZMS Council. No person shall receive the award more than once. The award consists of a certificate including an appropriate citation of the awardee's work, and will be presented (if at all possible) at the New Zealand Mathematical Society Colloquium Dinner in 2011.

All nominations and applications should be sent by 15 July 2011 to the NZMS President, Prof. Charles Semple (address as above).

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://nzmathsoc.org.nz/?accreditation`. At present, member applications are welcomed at any time. If you would like to be considered or would like to nominate someone, please send the 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

THE NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

APPLICATION FOR FINANCIAL ASSISTANCE

Please fill in where appropriate

Name of Applicant: .....

Address: .....

.....

.....

email: .....

Academic Affiliation / Official Status / Present Position:

.....

NZMS Status: Ordinary member ..... Student member .....

Date membership started .....

Signature: ..... Date: .....

Type of assistance sought	Amount
(a) Student Travel Grant	.....
(b) Research Grant: conference/travel/other	.....
(c) Grant from South Pacific Fund	.....
(d) Conference/Workshop Organisation	.....
(e) Other (please specify below)	.....

.....

.....

Estimated total expenditure: .....

Date of expenditure: .....

Other sources of assistance sought/approved (please specify below):

.....

.....

- Estimated total expenditure (please include a breakdown of this expenditure, e.g. conference fees, travel, accommodation, etc.)

  .....
  .....
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  .....

- List all previous support of this kind you have received from the NZMS in the past five years. (Please note that the society has a total funding cap of $ 1000 per student over the course of their studies)

  .....
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- Please give your reasons for making this applications and the plans you have for spending the grant if your application is successful:

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  .....

- Please list any supporting documents or other evidence (attached to your application):

  .....
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- Supporting statement from Supervisor, Head of Department or person of responsibility.

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Please send this application (and any supporting documents or other evidence) to:

Dr Alex James, Secretary, NZ Mathematical Society,
Dept of Maths and Stats
University of Canterbury,
Private Bag 4800,
Christchurch.

The NZMS Council normally considers these applications at its meetings in July and November each year, but applications may be considered at other times in exceptional circumstances.

New and Notable Titles from SIAM

www.siam.org/catalog

Spectral Approximation of Linear Operators

Available May

Françoise Chatelin

Classics in Applied Mathematics 65

This classic textbook provides a unified treatment of spectral approximation for closed or bounded operators as well as for matrices. Despite significant changes and advances in the field since it was first published in 1983, the book continues to form the theoretical bedrock for any computational approach to spectral theory over matrices or linear operators. This coverage of classical results is not readily available elsewhere.

2011 • Approx. xxvii + 458 • Softcover • ISBN 978-0-898719-99-4
List Price $75.00 • SIAM Member Price $52.50 • CL65

Numerical Methods for Large Eigenvalue Problems, *Revised Edition*

Available May

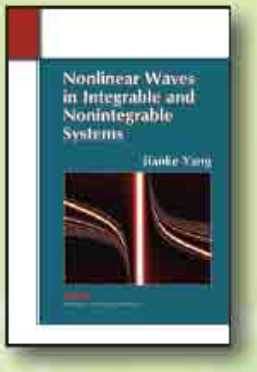
Yousef Saad

Classics in Applied Mathematics 66

This revised edition discusses numerical methods for computing eigenvalues and eigenvectors of large sparse matrices. It provides an in-depth view of the numerical methods that are applicable for solving matrix eigenvalue problems that arise in various engineering and scientific applications. Each chapter was updated by shortening or deleting outdated topics, adding topics of more recent interest, and adapting the Notes and References section.

2011 • Approx. x + 331 pages • Softcover • ISBN 978-1-611970-72-2
List Price $70.00 • Member Price $49.00 • CL66

Nonlinear Waves in Integrable and Nonintegrable Systems



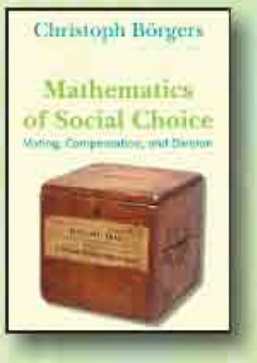
Jianke Yang

Mathematical Modeling and Computation 16

This book presents cutting-edge developments in the theory and experiments of nonlinear waves. Its comprehensive coverage of analytical methods for nonintegrable systems is the first of its kind. It also covers in great depth analytical methods for integrable equations, and comprehensively describes efficient numerical methods for all major aspects of nonlinear wave computations.

2010 • xxvi + 430 pages • Softcover • ISBN 978-0-898717-05-1
List Price $85.00 • SIAM Member Price $59.50 • MM16

Mathematics of Social Choice: *Voting, Compensation, and Division*



Christoph Börgers

How do you select a winner from a field of candidates? Rank a field of candidates? Share a divisible resource like a cake, or an indivisible one like a pet or a house? These questions are addressed in this fun and accessible book that takes an entertaining look at the choices made by groups of people with different preferences, needs, and interests.

2010 • xii + 245 pages • Softcover • 978-0-898716-95-5
List Price $35.00 • SIAM Members $24.50 • OT119

Probabilistic Boolean Networks: *The Modeling and Control of Gene Regulatory Networks*

Ilya Shmulevich and Edward R. Dougherty

This is the first comprehensive treatment of probabilistic Boolean networks, an important model class for studying genetic regulatory networks. It covers basic model properties, including the relationships between network structure and dynamics, steady-state analysis, and relationships to other model classes.

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