Number 113 February 2012

NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY

Contents

PUBLISHER'S NOTICE

This newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was edited by Steven Archer and printed at Victoria University of Wellington. The official address of the Society is:

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The homepage of the New Zealand Mathematical Society is:
http://nzmathsoc.org.nz/ (Webmaster: bbaeumer@maths.otago.ac.nz)
The newsletter is available at: http://nzmathsoc.org.nz/?newsletter
Editorial enquiries and items for submission to this journal should be submitted as text or LaTeX files to steven.archer@vuw.ac.nz.

ISSN 0110-0025

PAST PRESIDENT'S COLUMN

Presidents Report 2011
New Zealand Mathematical Society

This year completes my ninth year on Council. My first term was 1999-2002, in which I was the Secretary of the Society. In 1999, the Marsden Fund was only three years old, there was no Performance Based Research Fund, and the New Zealand Institute of Mathematics and its Applications hadnt yet existed. While it is easy to reflect on such obvious differences between then and now, it is the other differences that I find more striking.

In the last 10 years, New Zealand based mathematicians have been internationally recognised in unprecedented waysfrom Fellowships of prestigious societies to invited addresses at the International Congress of Mathematicians. Today, the breadth of New Zealand mathematics is quite staggering. One simply needs to consider the wide variety of workshops and conferences now held every summer in New Zealand to recognise this. These, together with new appointments at both junior and senior levels, the continuing trend of new faces at the Colloquium, and the increasing competition for grants, are all indicators of an extremely healthy and vibrant community. I look forward to the next 10 years and the success that it may bring for New Zealand mathematics.

Membership

Our total membership is 271 (Ordinary, 175; Reciprocal, 19; Student, 53; Honorary, 17; Life, 7). Welcome to the following new members.

New Ordinary Members: Andrew Gatland, Jrg Hennig, Heung Yeung Lam, Dimitri Leemans, Jeanette McLeod, Gavin Ritz, Charles Unsworth.

New Student Members: Alex Adebayo, Matthew Barrett, Nick Brettell, Kai Cheung Leung, Leon Luo, Jicheng Ma, Sophie Shamailov, Simon Todd.

New Reciprocal Members: Adebayo Oluwaseun Kazeem, Vladimir Pestov.

Activities

Kevin Broughan, Sunanda Dikshit, Wen Duan, Luke Fullard, Annie Gorgey, Nurul Latif, Jicheng Ma, Manfred Sauter, Simon Todd, Angela Tsai, Shafiq Ur Rehman were awarded travel grants. Simon Todd was awarded a publication grant for his Scholarship Calculus text/workbook.

We provided grants to the NZMS Colloquium (Auckland, 2011), the New Zealand Mathematics and Statistics Postgraduate Conference (Wellington, 2011), the New Zealand Mathematics Olympiad team, and the New Zealand Journal of Mathematics.

As part of a reciprocal arrangement with the London Mathematical Society, the inaugural Aitken Lecturer Geoff Whittle of Victoria University of Wellington visited the United Kingdom in October. Starting at St Andrews, he visited Manchester, Cambridge, Queen Mary, and Oxford. From speaking with my UK colleagues, the talks were excellent and the tour was an outstanding success. Below are the titles and abstracts of Geoffs two talks.

1. Matroid Representation over Infinite Fields

   A canonical way to obtain a matroid is from a finite set of vectors in a vector space over a field F. A matroid that can be obtained in such a way is said to be representable over F. It is clear that when Whitney first defined matroids he had matroids representable over the reals as his standard model, but for a variety of reasons most attention has focussed on matroids representable over finite fields. There is increasing evidence that the class of matroids representable over a fixed finite field is well behaved with strong general theorems holding. Essentially none of these theorems hold if F is infinite. Indeed matroids representable over the realthe natural matroids for our geometric intuitionturn out to be a mysterious class indeed. In the talk I will discuss this striking contrast in behaviour.

2. Well-quasi-ordering of Binary Matroids

   The Graph Minors Project of Robertson and Seymour is one of the highlights of twentieth-century mathematics. In a long series of mostly difficult papers they prove theorems that give profound insight into the qualitative structure of members of proper minor-closed classes of graphs. This insight enables them to prove some remarkable banner theorems, one of which is that in any infinite set of graphs there is one that is a minor of the other; in other words, graphs are well-quasi-ordered under the minor order. A canonical way to obtain a matroid is from a set of columns of a matrix over a field. If each column has at most two nonzero entries there is an obvious graph associated with the matroid; thus it is not hard to see that matroids generalise graphs. Robertson and Seymour always believed that their results were special cases of more general theorems for matroids obtained from matrices over finite fields. For over a decade, Jim Geelen, Bert Gerards and I have been working towards achieving this generalisation. In this talk I will discuss our success in achieving the generalisation for binary matroids, that is, for matroids that can be obtained from matrices over the 2-element field. In this talk I will give a very general overview of my work with Geelen and Gerards. I will not assume familiarity with matroids nor will I assume familiarity with the results of the Graph Minors Project.

Marston Conder of the University of Auckland is the first outgoing Maclaurin Lecturer. His lecture tour of the United States in 2012/13 includes a plenary address to the American Mathematical Society. The NZMS is currently arranging the first incoming Maclaurin Lecturer. This was expected to take place this year.

NZMS Awards

The Aitken Prize for 2010 was awarded to Rachael Tappenden of the University of Canterbury for her talk Extensions of compressed sensors.

The Early Career Award for 2010 was awarded to Mihly Kovcs of the University of Otago for his innovative research in the field of stochastic partial differential equations, particularly their numerical approximation.

The Research Award for 2010 was awarded to Charles Semple of the University of Canterbury for his landmark contributions to combinatorics, and in particular matroid theory, as well as leading work in phylogenetics and computational biology.

Bruce van Brunt, Mike Hendy, and Winston Sweatman of Massey University were elected Fellows of the New Zealand Mathematical Society.

Thank you to the Aitken Prize panel and the awards committees.

RSNZ Awards

Adam Day of Victoria University of Wellington was awarded the Hatherton Award for 2011 for his paper entitled Increasing the gap between descriptional complexity and algorithmic probability. The sole-authored paper was published in the prestigious Transactions of the American Mathematical Society. Adam is currently a Miller Fellow at the University of California, Berkeley.

Rod Downey of Victoria University of Wellington was awarded the Hector Medal for 2011 for his outstanding, internationally acclaimed work in recursion theory, computational complexity, and other aspects of mathematical logic and combinatorics.

Rod Downey is internationally recognised for his influential and innovative work in mathematical logic and computer science. He is acknowledged as one of the worlds foremost experts in recursion theory, a technically difficult branch of mathematical logic dealing with the fundamental limits of computation. He inaugurated research in parameterised complexity, which includes the input size as one of the parameters in the analysis of the complexity of computation. This work attracted the attention and involvement of several leading complexity theorists worldwide, and culminated in the publication of a large monograph in 1999.

In recent years, Rod and his collaborators have made very significant advances in the study of algorithmic randomness and complexity, again culminating in a large monograph, published in 2010. In

addition to these two books, he has published more than 220 research articles in leading journals and conference proceedings.

His international standing is highlighted by his invitation to give an address at the 2006 International Congress of Mathematicians, the first New Zealand based mathematician invited to do so. In addition, he has presented invited talks at numerous high-level, international meetings around the world; organised several such meetings himself; supervised many excellent doctoral students; and attracted many outstanding young mathematicians from around the world to work with him as postdoctoral research fellows (19).

Rod Gover of the University of Auckland was elected a Fellow of the Royal Society of New Zealand. Rod is internationally recognized for his work in geometry and its applications to analysis, differential equations, and theoretical physics. His research not only tackles fascinating mathematical problems, but is of direct relevance to other fields of science. For instance conformal geometry, one of the geometries that he studies, can be used to explain how light behaves as it travels through space, how cells organize themselves in tissues, and the properties of materials used in construction.

Other Honours

Marston Conder of the University of Auckland and Matt Visser of Victoria University of Wellington were awarded James Cook Research Fellowships (2012-2013).

Acknowledgments

Thank you to the Council for all their efforts this year. A particular thank you to Alex James (Secretary) and Peter Donelan (Treasurer). I wish Graham Weir every success as he takes on his new role as President of the NZMS.

Charles Semple
Immediate past president, New Zealand Mathematical Society
6 December 2011

PRESIDENT'S COLUMN

I am delighted to announce that Steven Archer of VUW is the incoming Editor of the NZMS Newsletter. The Newsletter has been published three times a year, and in order to maintain this tradition, edition No. 113, which should have been published in December 2011, will be published in February 2012. We aim to publish edition No.114 around April or May, and to resume normal publication from August onwards. We are committed to the concept of Centrefolds, and aim to resume this tradition in the next Newsletter. Professor John Butcher at the December 2011 Mathematics Colloquium has suggested that the Newsletter should contain more mathematics. Looking back at the 1983 copies of the Newsletter, I see in the January 1983 issue an article by David Gould on the four-dimensional Poincare conjecture; in the April 1983 issue Roy Kerrs elegant 18-sided construction; and in the August 1983 issue an article by Jim Ansell on Singular Value Decomposition. John Butcher is correct that the mathematical content of the Newsletter has reduced over time, and now seems an excellent time to consider how this matter should be addressed. If you have any suggestions, please forward them to me, for consideration in the next issue.

Finally, I wish to thank Charles Semple for his contribution as President, and Alex James for her contribution as Editor. Their terms in office have been significantly affected by the Canterbury earthquakes, and their efforts have been much appreciated.

Graham Weir
President

EDITORIAL

I'll make this brief, without much fanfare, as my current priority is to get this issue out the door and into your hands.

I would like to say thank you to all the local correspondents, for your efforts so far and in to the future. Your hard work in passing on all the good news you find, is recognised and really is appreciated.

Also, a preemptive thanks to the office staff here at Victoria University of Wellington, who are about to help get this issue printed. I'm not sure exactly who you are yet, but you will be thanked individually in the next issue!

Steven Archer
Editor

LOCAL NEWS

INDUSTRIAL RESEARCH LIMITED

In October, Donal Krouse, Karen Garner and Warwick Kissling gave talks at an IRL-hosted workshop for the electricity industry. The general theme of the workshop was Intelligent Networks, and the talks concerned statistical analysis, optimisation and complex system modelling. Feedback from the participants was excellent, and we hope that a number of follow-up projects will result from this meeting. In November, Warwick Kissling and John Burnell attended the 2011 New Zealand Geothermal Workshop at Auckland University. Warwick gave a talk entitled Modelling the flow of hydrothermal fluids above an evolving continental rift, describing recent work he has been doing with Susan Ellis at GNS. John contributed to a paper on the Ngatamariki geothermal field, in collaboration with colleagues from Mighty River Power. Dion ONeale spoke to MESA - the MacDiarmid Emerging Scientists Association about his work on patents, power laws and what they can tell us about innovation. He also spoke to Students and Scotts and Queen Margaret's colleges about Maths Modelling and Science writing in his role as a FutureInTech ambassador. In early December, he spoke (on Shaun Hendy's behalf) to ISPIM (International Society for Professional Innovation Management) about "Lifting New Zealand's productivity through innovation - what the data can - and can't - tell us?" IRL hosted the 14th annual Wellington-Manawatu Applied Mathematics Meeting in early November. The event was very successful, with 35 participants from Massey, VUW and IRL. The programme was very full, with 19 high quality talks on topics ranging from geothermal energy to quantum gravity. Nicola Gaston and Shaun Hendy attended the ZING Nanomaterials Conference in Xcaret, Mexico. Our French interns, Simon DelTombe and Arnaud Kammler left us in early December after working at IRL since July. They have both been working on problems related to geothermal energy and gave excellent end-of-internship seminars. We particularly appreciated the crpes they brought for their penultimate morning tea and will miss their good company. And finally, we welcome three new summer students: Michelle Cook (working with Nicola Gaston) will be using quantum chemistry techniques to investigate properties of small clusters of atoms. Rebecca Sutton (Shaun Hendy) is back for a second year, and is studying the physics of slip in fluid dynamics, in particular, the motion of droplets along surfaces, using molecular dynamics. And Jessica Kerr (Dion O'Neale) will be using simulations with small world networks and preferential attachment to study networks of patents and their role in innovation.

Warwick Kissling

THE UNIVERSITY OF AUCKLAND

DEPARTMENT OF MATHEMATICS

The period since the previous Newsletter has been a busy time for the Department. The Mathematics/Physics Block is undergoing major reconstruction to strengthen its resistance to earthquakes, and in July 2011 we were scattered to diverse temporary sites, with our books and papers going into storage. In February 2012 we returned to the Mathematics/Physics Block, where we continue to be serenaded by jackhammers. Many of the graduate students and Post-Doctoral Fellows have moved into the Old Choral Hall, where the opening ceremony for Auckland University College was held in 1883. Several new academic staff have recently joined our Department. Dr Tanya Evans, the new Professional Teaching Fellow, comes from Massey University where she tutored and lectured undergraduate mathematics. She will back up JuliaNovak, in her role of Undergraduate Coordinator. Dr Igor Klep, an algebraist from the University of Ljubljana, is now a Lecturer here. Dr Bernd Krauskopf and his wife Dr Hinke Osinga, who both work in dynamical systems, have come from Bristol University and are now Professors here. She is the first woman Professor in our Department. Four of their PhD students at Bristol have come with them. Dr Dimitri Leemans, an algebraist from Brussels, is now a Senior Lecturer here. Dr Ben Martin, an algebraist from the University of Canterbury, is now Associate-Professor here. Dr Sione Ma'u, who gained here his PhD in analysis, is now a Lecturer. Dr Ivo Siekmann (in the Bioengineering Institute) is also a Research Fellow in our Department.

John Butcher was the featured reviewer in "Computing Reviews" (September 2011) in their monthly section 'Featured in Five', with his responses to 5 questions about his career in computing. In January 2012 John spent a week at the University of Halle where he gave a seminar, after which he attended a workshop at the Mathematisches Forschungsinstitut Oberwolfach on "Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering". And then he spent a week at the University of Salerno, where he gave two seminars. John has been appointed to the Editorial Board of the Malaysian Journal of Mathematical Sciences. Also, he applied (through his private company) for a Mars-

den grant, which he did get. Two articles by John have been published in the "Springer Encyclopedia of Applied and Computational Mathematics". The cost of that 9-volume Encyclopaedia might perhaps have precipitated the current financial crisis in Europe. Marston Conder has been selected by the American and New Zealand Mathematical Societies as the first Maclaurin Lecturer, and will make a lecture tour of US universitiesi n 2012/13. He has also won a two-year James Cook Fellowship (2012-2014) from the Royal Society of NZ, and has been appointed as a Distinguished Professor at the University of Auckland from 2012 onwards. In October 2011, Marston gave an invited course of lectures at the Fields Institute (Canada) on symmetries of maps and polytopes, as part of the Fields programme on Discrete Geometry and Applications. Also in December he attended the 35th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing, at Monash University, in December 2011. [Note: The dates of the latter meeting clashed with those of the NZ Mathematics Colloquium for the 3rd or 4th year in succession; it would be good if organizers of future NZ Mathematics Colloquia could attempt to avoid such a clash between mathematics conferences for NZ-based mathematicians.] Graham Donovan has received a New Staff FRDF grant. Rod Gover was elected a Fellow of the Royal Society of New Zealand, at the 2011 AGM of the RSNZ Academy. Of the 12 new Fellows, he was the only one from the University of Auckland, and also the only one in the mathematical and information sciences. Sina Greenwood gave an invited talk on "Connected generalized inverse limits" at the Summer Conference on General Topology and its Applications, at New York in July 2011. Jari Kaipio's application for a PostDoctoral Fellow has been approved in the latest FRDRF round. Vivian Kirk has received a Mardsen award. In December Ben Martin made a research visit to the University of Bochum in Germany for a week to work with his collaborators Michael Bate, Sebastian Herpel and Gerhard Röhrle. Mike Meylan left our Department in November 2011, to become a Senior Lecturer at the University of Newcastle. Julia Novak is now a Professional Teaching Fellow. Hinke Osinga received a Mardsen award, a few days after she arrived in the Department. Claire Postlethwaite has received the Young Researchers Award from the New Zealand Mathematics Society. And also she has gained a Marsden award. James Sneyd received a Marsden award, as a Principal Investigator. Wiremu Solomon left our Department in January 2012, to become a teacher of mathematics and statistics at a Maori-language college in Hamilton. He will teach those subjects in English, but otherwise he will speak there in Maori. Garry Tee contributed an article about Alan Turing's pioneer work on rounding errors in solving linear algebraic equations, for the special Alan Turing issue of The Asia Pacific Mathematics Newsletter, vol. 2, No. 1 (January 2012). That Alan Turing issue is part of The Alan Turing Year 2012, with massive celebrations worldwide of the centenary of the birth of Alan Turing. Caroline Yoon has received a New Staff FRDF grant.

Louise Sheryn was an Administration and Research Assistant to Bill Barton. She has now accepted a job as a Lecturer in the School of Science, Mathematicss and Technology, in the Faculty of Education. So she'll be leaving us soon, which is a bad thing (for us) - but she is going to an excellent and well-deserved promotion, which is a good thing for her (and for us). Edoardo Persichetti's poster "Cryptography - Mathematics of Crypts?" was awarded the 4th place and a High Distinction in the postgraduate Science Poster Competition. This year, 51 posters were submitted (but only one from Mathematicss) and the 20 best will go to Exposure, the PGSA/University-wide posters competition. Edoardo's poster stood out for its introduction of his domain of research, spanning from historical facts to current public-key cryptography problems, as well as for its clever graphics and overall appeal. Our congratulations to Edoardo. Amer Qureshi successfully passed his PhD oral examination. Angela Tsai is now PhD Her thesis was in numerical methods which are efficient for differential equations for which the direct computation of the second derivative is feasible and economical.

The 8th Delta Southern Hemisphere Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics was held in Rotorua from 27th November to 2nd December 2011. The conference was a great success, attracting a record attendance of 155 delegates from many countries, especially the constituent Delta communities of Australia, South Africa, New Zealand and South America. The conference was jointly organized by the Universities of Auckland and Canterbury, with support and sponsorship from many other institutions, including AUT, Unitec, Waikato University, Victoria University, NZIMA, CULMS, NZMS, Statistics NZ, HRS and Ako Aoteoroa. The theme of the conference was "Te Ara Mokoroa", or The Long Abiding Path of Knowledge, with presentations focusing on the path students take between university and school, both in bridging courses and adult education through to teacher training, and emphasising the links between the different mathematical domains of pure and applied mathematics, statistics and engineering. Highlights of the conference included highly stimulating keynote presentations

from John Mason, Professor of Maths Education at the Open University (UK); Jennifer Brown, Professor of Statistics at the University of Canterbury; Peter Adams, Professor of Mathematics at the University of Queensland; and David Holgate, Associate Professor of Mathematics at the University of Stellenbosch. And a superb conference dinner was held at the historic Blue Baths. Two sets of proceedings were published from the conference: the first, containing 16 selected papers, was published as a Special Edition of the International Journal of Mathematical Education in Science and Technology (IJMEST), Vol 42(7), available online from Taylor and Francis; and the second, containing 100 papers and abstracts for the remaining presentations, was published locally by the Universities of Canterbury and Auckland. It is available online from: http://www.math.canterbury.ac.nz/~j.hannah/Delta11/VolcanicDelta2011Proceedings.pdf

The next Delta conference will be held in 2013 at Kiama (NSW), from 24th to 28th November. See www.delta2013.net

Recent visitors include: Dr Rachel Camina (University of Cambridge), Prof. Andreas Cap (University of Vienna), Dr Javier Cirre (UNED, Madrid), Dr Tomas Connor (Université Libre de Bruxelle), Prof. Piotr Faliszewski (AGH University of Science and Technology, Krakow), Prof. Colm Fitzgerald (University of Oxford), Dr Victor Flynn (University of Oxford), Prof. Merrilyn Goos (University of Queensland), Dr Kengo Hirachi (University of Tokyo), Prof. Derek Holt (University of Warwick), Dr Edward Huang (National Cheng Kung University, Taiwan), Dr Isabel Hubard (Universidad Nacional Autónoma de México), Dr Jerome Lang (Université Paris Dauphine), Prof. Emanuele Latini (UC-Davis), Prof. Martin Liebeck (Imperial College London), Dr Grant Lythe (University of Leeds), Prof. Horst Malchow (Universität Osnabrück), Prof. Aleksander Malnic (University of Ljubljana & University of Primorska), Dr Aisling McCluskey (National University of Ireland, Galway), Prof. Alan McIntosh (ANU), A-Prof. Kevin McLeod (University of Wisconsin-Milwaukee), Prof. Tomaz Pisanski (University of Ljubljana, Slovenia), Dr Rok Pozar (University of Ljubljana, Slovenia), Prof. Cheryl Praeger (UWA), Dr Sinai Robins (Nanyang Technological University), Prof. Bernardo Rodrigues (University of Kwazulu-Natal), Prof. Jan Saxl (University of Cambridge), Dr Josef Silhan (Masaryk University, Brno), and Prof. Andrew Waldron (UC-Davis).

Garry J. Tee

DEPARTMENT OF STATISICS

After 17 years as the plain old Department of Statistics, 2011 has seen us reinvented as the Department of Statistics and Media Babes! First and foremost - check out our new statistics blog StatsChat at www.statschat.org.nz, established in June as a vehicle for public outreach and statistics education. Hot topics range from the predictions of Richie McCow to the truth about earthquakes and the moon, and a cursory browse through the entertaining and excellent contributions to date will reveal why the blog has already attracted the attention of the press from MediaWatch to the NZ Herald's Sideswipe. All contributions are welcome - the perfect opportunity to propel your statistical wit and wisdom into the blogosphere! Or enter the Statistic of the Week competition to win a $20 iTunes voucher.

Meanwhile, it seems the national media just can't leave us alone. David Scott is the media favourite for picking the rugby scores - "Statistician proves he can pick the winners" - while Andrew Balemi is the man for picking Lotto numbers: "Revealed - Your chances of winning the $34 million jackpot!" (Evidently quite small on the basis that Andrew is still seen at work regularly.) Aiming to take the chance *out* of netball is PhD student Bobby Willcox, whose laptop can be seen pumping furiously on the sidelines while the Silver Ferns are playing: "Netball: Crunch1ng numb3rs 4 NZ". After all this exertion, it feels like it's time to chill out and go fishing. Don't worry about the phase of the moon, says Masters student Ben Stevenson, who has been working with Russell Millar on analysing the success rate of the Maori and lunar fishing calendars. Just pick a sunny day when you've got a bit of free time - you probably won't catch much anyway, so there's no point in getting cold and wet just for a 6% lunar surplus.

A warm welcome to Marie Fitch, who has joined the department as a Professional Teaching Fellow after several years at Massey Albany. Welcome to the team, Marie!

Congratulations to Ilze Ziedins, Nick Shears, and Kathy Ruggiero, who have each won prestigious and highly competitive research grants. Ilze's $\$465K$ Marsden grant on improving transport flow via "Control of equilibria in queueing networks with selfish routing" seems destined to sort out Auckland's inconsiderate drivers once and for all. Ilze's project was selected for special press release, and was the featured project for the NZ Herald's entire coverage of this year's Marsden awards. Nick Shears won a 5-year Rutherford Discovery Fellowship for "Maintaining healthy marine ecosystems under increased anthropogenic stress and a changing climate": one of just ten fellowships awarded

nationwide each year. Kathy Ruggiero's scoop is an Emerging Researcher Award from the HRC: "Probing illness with a novel multi-omic time course statistical platform." The department is very lucky to be host to such diverse and cutting-edge research projects.

Congratulations also to Russell Millar on the publication of his book, "Maximum Likelihood Estimation and Inference: With Examples in R, SAS and ADMB", published two weeks ago by Wiley. The word has it that the book's contents are even better than the front cover - which is a work of art in itself. Definitely a new addition for the invaluable texts and frequent-access section of your personal library.

Our PhD students have been doing us proud recently, with Jing Liu and Sam McKechnie scooping first and third prizes for the student presentations at the NZSA conference. Drs Jon Briggs and Asad Ali are our newest completed PhDs, each leaving the department with one more thesis and one more offspring than they arrived with. And on that subject, the surge of baby boys continues, ensuring that this newsletter correspondent STILL does not need to think up a new topic with which to close the local news contribution. Many congratulations to Stephane Guindon and Stephen Cope on the births of their respective sons Tom and Lance. Running total since 2000: now 27 boys and 6 girls and counting...

Rachel Fewster

AUCKLAND UNIVERSITY OF TECHNOLOGY

School of Computing and Mathematical Sciences

AUT was of one sponsors for the 8th Delta Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics, from 27 November to 2 December 2011 at Rotorua. Three staff from AUT (Robin Hankin, Farida Kachapova, and Sergiy Klymchuk) presented talks at this conference, and Sergiy Klymchuk was one of members of the Scientific Programme Committee. The 2011 NZMS Colloquium was co-hosted by AUT University and the University of Auckland, from 6 to 8 December at Auckland, with 7 plenary talks and about 60 contributed talks. Prof Jeff Hunter and Dr Hyuck Chung were members of local organizers from AUT side. Four staff from AUT (Vitali Babakov, Jiling Cao, Hyuck Chung, and Guanghua Lian) presented talks at the Colloquium. This was the first time that AUT involved with organizing the NZMS colloquia. Two staff (Jiamou Liu and Farida Kachapova) participated in and presented talks at the 12th Asian Logic Conference, held at the Victoria University of Wellington, 15-20 December 2011.

In November 2011, Dr Vitali Babakov presented his joint research work with Dr Alla Shymanska on "Initial stage of mass flow through a plane hopper" at the International Conference of Science and Engineering, CUTSE 2011, in Curtin University.

Murray Black has been working on his PhD comparing academic learning in statistics using an inquiry approach over three distinct learning environments. He presented the research methodologies in education research at Deakin University and a seminar on assessing statistics in the Workplace at a Learning State Conference in Auckland. He has been a national assessor in Official Statistics for unit standards within the National Certificate of Official Statistics and also jointly presented a block seminar on sampling and inference using Official Statistics at the Victoria University, Wellington.

In October, Prof Salvador Garcia-Ferreira from the National University of Mexico visited the School of Computing and Mathematical Sciences (SCMS). During his visit, Salvador collaborated with Associate Professor Jiling Cao. The two of them have discussed and worked on some topics on Analysis and Topology. On 27 October, a workshop on "Infinite-dimensional Analysis and Topology" was held at the SCMS. Twenty researchers from Auckland region gathered together at the workshop to discuss a range of topics in this field, and eight experts presented keynote speeches on their recent research work.

Between August and November, Dr Andrew Ensor managed to slip away on some very overdue sabbatical to Europe and Chile. In Europe he was hosted at the Università di Siena, Sony-Ericsson and Lund University, and attended conferences in Munich and Paris. In Chile he was hosted by the Universidad Católica de Maule where he worked with his former student Felipe Liilo and gave seminars on their research that required some impromptu Spanish. Felipe graduated from AUT with his PhD in December with the thesis entitled "Coloured-edge graph approach for the modelling of multimodal networks". Andrew also coauthored a book chapter "Data provenance and management in radio astronomy: a stream computing approach" with his student Mahmoud Mahmoud and Prof Sergei Gulyaev, along with Alain Biem and Bruce Elmegreen from IBM, and coauthored another paper "GPU-based image analysis on mobile devices" for IVCNZ 2011 with his student Seth Hall.

Dr Robin Hankin presented his Gaussian process work to the NZSA conference 2011 at the University of Auckland. He has appeared on TVNZ's "Close Up" and "Fair Go" current affairs problems, discussing the statistics of a remarkable coincidence, and interviewed live as a probability expert on RadioLive. He has also been quoted in The Herald on Sunday, as part of an interview discussing national Lotto statistics. Due to his friendly nature and public popularity, he is our media star!

In September, Prof Jeff Hunter returned to Europe as an invited speaker at MSMPRF 2011 (Markov & semi-Markov Processes & Related Fields 2011) at Porto Carras Grand Resort, Sithonia, Greece and delivered a talk entitled "The role of Kemeny's constant on properties of Markov chains?". At this conference he also organized a special invited session on Markov chains with contributions from Professor Stephen Kirkland (National Univ of Ireland, Maymooth, Ireland), Professor Panos Vassilou (Aristole Univ Thessaloniki, Greece), Prof Jose Palacois (Simon Bolivar Univ, Caracas, Venezuela), Professor Eugene Seneta (Univ Sydney) and Dr Konstanin Avratchenov (INRIA, France). Our jet setter, Jeff Hunter, is expected to keep travelling in 2012 and continue researching on properties of Markov chains.

In October 2011 Associate Professor Sergiy Klymchuk became a fellow of the Institute of Mathematics and its Applications (IMA) based in the UK.

Dr Guanghua Lian gave a talk entitled "Consistent modeling of SPX and VIX options: efficient evaluation issues in Gatheral's three factor model" at the 55th annual meeting of Australian Mathematical Society at the University of Wollongong, Australia. In December he visited Assoc Prof Ken Sui, the School of Applied Finance and Actuarial Studies, Macquarie University, Australia to accept the invitation and attend the Quantitative Method in Finance conference, Sydney, Australia.

In September, Dr. Jiamou Liu was invited to participate in the month-long program of Automata Theory and Application, organized by the Institute of Mathematical Sciences (IMS), National University of Singapore. The program invites over 30 experts in automata theory from Europe, USA, and the Asia-Pacific region. During the period, the invited researchers participated in discussion forums and collaborations on a range of interdisciplinary projects. As part of the program, a workshop on automat theory was held in the IMS. On the workshop, Jiamou gave an invited lecture entitled "Isomorphism problem on automatic trees". In October, Jiamou Liu received fast start Marsden fund for this project "Games and automaticity" for the period 2012-2014 worth $330,000 as a principal investigator, together with two associate investigators Prof M. Lohrey (University of Leipzig) and Prof D. Kuske (Technical University of Ilmenau). The research will explore some well-known foundational problem in the field of mathematical logic and theoretical computer science. In particular, Jiamou will study the interactions between games played on graphs and automatic structures. In November, Jiamou Liu received the Vice-Chancellor's Research Award for emerging researchers at AUT.

In September 2011, Dr Alla Shymanska participated in the 55th annual meeting of Australian Mathematical Society held at the University of Wollongong, where she presented her recent research work on mathematical modelling of image converters and intensifiers.

Seminars

Colm Fitzgerald (University of Oxford), "Time domain simulations for floating structures"

Jeffrey Hunter (Auckland University of Technology), "The role of Kemeny's constant in properties of Markov chain"

Guanghua Lian (Auckland University of Technology), "Mathematical finance: the Math changing the financial world"

Jiamou Liu (Auckland University of Technology), "Automatic structures with transitive relations"

Alla Shymanska (Auckland University of Technology), "Numerical analysis of image converters and intensifiers"

Jiling Cao

UNIVERSITY OF CANTERBURY

DEPARTMENT OF MATHEMATICS AND STATISTICS

The department looks back at a year we won't ever forget, a year with many challenges we could have done without. We had a succession of earthquakes, aftershocks and heavy snowfalls. Staff and students

have been amazingly resilient through all the disruptions. In the second half of the year the department settled into a new kind of normality. The seminar series restarted. The department's tutorial rooms and computer labs were up and running in time for the big Semester 2 courses, but we still had only temporary office accommodation. We had regular lecture hours although classes where still delivered in unfamiliar locations. It was heartening to see the cheerful enthusiasm of students determined to succeed despite the circumstances.

Remediation of the Erskine office block is still in progress. We expect to leave our current temporary home in the Rutherford building (Chemistry) and be back in our old offices for the start of Semester 1 next year. We are looking forward to a normal and uneventful 2012!

Despite all the upheaval during the year there are a number of staff achievements to report. Phillipa Williams received a College Teaching Award for being an outstanding Early Career teacher and also won in the College of Engineering category for the UCSA lecturer of the year.

The book "Apartness and Uniformity: A Constructive Development", by Douglas Bridges and Luminita Vita, was published in October, largely an exposition of the authors' own research, as the fruits of ten years' work. The theory presented in this book is developed constructively, is based on a few axioms encapsulating the notion of objects (points and sets) being apart, and encompasses both point-set topology and the theory of uniform spaces. Douglas is a world authority on constructive mathematics and it is very fitting he was awarded the 2011 University of Canterbury Research Medal. The University's premier research award was presented at the Graduation ceremony on the afternoon of 14th December.

This years Marsden Fund grants were announced in early October but additional funding has seen Mike Plank, the next on the list, receive a late Marsden grant, $311,000 over three years for his project on cell invasion. Cell invasion is responsible for a wide range of physiological processes. This research will develop new mathematical theory for the microscopic interactions underpinning these processes. The results will be used to assess the efficacy of novel clinical interventions in cell invasion, for example to enhance wound healing or to impede malignant growth.

Congratulations to Clemency Montelle, James Degnan and Raazesh Sainudiin on being promoted to the rank of Senior Lecturer.

James and Vanessa Degnan welcomed their first child, a son named Quinn Erasmus Degnan, to the world on August 7. Richard and Emily Brown saw the birth of their fifth child, a son named Toby Joshua Brown, on August 15. Six weeks early, Toby tested his dad's emergency ice-driving skills since he arrived during heavy snowfall. That day as well as the following day the university was closed.

Ben Martin had his last day at Canterbury on August 25 after seven years in the department. Ben took up a position of Associate Professor in the Department of Mathematics at the University of Auckland.

The department welcomed Patrick W. Saart, who took up a 2-year fixed term lecturer position on 12 September. Patrick's research interests are in econometric theory, time series analysis, nonparametric and semiparametric inferences and financial mathematics.

Peter Renaud and Blair Robertson had their contracts extended.

Maarten McKubre-Jordens, currently on a postdoctoral fellowship with Douglas Bridges, is soon to start a two-year fixed term lecturing position in the department. His research interests are in nonclassical analysis and para-consistent logic.

Congratulations to Rachael Tappenden, who has completed her PhD and will be graduating in December. Rachel was joint supervised by Peter Renaud, Ian Coope and Bob Broughton. Her thesis is on the development and implementation of algorithms for fast image reconstruction. She will soon depart New Zealand to take up a postdoctoral position in Edinburgh.

Conferences, workshops and visits

Elena Moltchanova, Peter Smith and Jennifer Brown, along with postgrad students Sabariah Saharan, Joe Zhu and Irene van Woerden, attended the annual NZSA conference in Auckland, 29-31 August. It was Jennifer's last AGM as NZSA President.

As part of Black Robin project funded by the Brian Mason Foundation, Raaz Sainudiin spent almost a month on the mammal-free Rangatira Island in the Chathams, with UC colleagues from Biological Sciences, doing a mix of field observations and on-site statistical computing. They developed a novel spatial population pedigree model that accounts for the behavioural ecology of the Black Robins in an effort to better understand the extinction risk due to inbreeding depression. The Chatham Island Black Robin is the worlds most endangered bird species that was rescued by intensive management in the 1980s from just one breeding pair.

CAMS PhD student Steve Manion presented a poster titled 'Wikipedia-based context visualisations' at the Machine Learning Summer School (MLSS) in Bordeaux, France on 4 September. Only 35% of applicants were accepted for this Summer school and Steve was the recipient of a scholarship from the organisers. Steve reports that it is a boot camp for many machine learning techniques used in research and industry. He is finding that the concepts he has been learning have great potential benefits for his project and he would recommend the school to any Mathematics student, especially those enrolled in Computational and Applied Mathematics.

Chris Price gave a talk 'Recycling Bases in the Halton Sequence: an Optimization View' at the 55th Australian Mathematical Society (AustMS) meeting at the University of Wollongong, NSW, 26-29 September.

Rua Murray participated in a focussed research group at the Banff International Research Station for Mathematical Innovation and Discovery in October, courtesy of a grant from the College Strategic Fund, and visited collaborators in Victoria, Canada.

Maarten McKubre-Jordens visited the University of Melbourne in October. He was invited for a research visit to work with Zach Weber on the ARC funded project 'Paraconsistent Foundations of Mathematics'. While there, he gave a research seminar entitled 'A proof technique reminiscent of Brouwer's bar induction'. Maarten also gave a talk at the NZMS Colloquium at the University of Auckland, 6-8 December.

Douglas Bridges participated in the Oberwolfach workshop on "Mathematical Logic: Proof Theory, Constructive Mathematics" on 6-12 November, and visited the Mathematisches Institut at the University of Munich on either side of the meeting.

Miguel Moyers-Gonzales attended a workshop on Viscoplastic Fluids: from Theory to Application, in Rio de Janeiro in November.

Charles Semple made a research visit to Durham University, 12-27 November, and gave a plenary talk at the NZMS Colloquium at the University of Auckland, 6-8 December.

John Hannah, Irene David, Alex James, Clemency Montelle and Mike Plank served on the scientific programme committee of the 8th Delta conference on the teaching and learning of undergraduate mathematics and statistics, which was held in Rotorua, 27 November to 2 December. They and Jennifer Brown, Liz Ackerley, Jane Clucas, Hilary Seddon and Phillipa Williams attended the conference. Jennifer, Alex, John, Mike and Phillipa gave talks at the meeting.

Jennifer Brown was invited to Otago University and presented a seminar on 15 September on her work in adaptive sampling 'Adaptive sampling; my journey that began in the Department of Mathematics and Statistics, Otago University'. She gave a talk titled 'Adaptive and Unequal Probability Survey Designs for Environmental Management' and organised a session (Survey Designs for Ecological Monitoring) at the International Conference on Modelling and Simulation (MODSIM 2011) in Perth, 12-16 December. Marco Reale also attended MODSIM 2011.

Clemency Montelle gave a talk on 'Hypsicles of Alexandria and his Little Work on Rising Times' at a History and Philosophy of Science Unit seminar, University of Sydney, 22 August. While there, she also attended the annual executive meeting of the Australasian Association for the History Philosophy and Social Studies of Science (AAHPSSS) in her capacity as NZ Vice-President of the association.

Sha (Joe) Zhu a contributed a talk 'Clades and Clans Probability in Yule Trees' at Phylomania 2011, The UTas Theoretical Phylogenetics Meeting, at the University of Tasmania, 10-11 November, and attended Workshop III: Evolutionary Genomics, Mathematical and Computational Approaches in High-Throughput Genomics, at UCLA, 15-18 November

James Degnan, and PhD students Peter Jaksons and Agate Ponder-Sutton attended NZMASP 2011 (NZ Mathematics and Statistics Postgraduate Conference) in Wellington, 21-24 November.

Günter Steinke, Jeanette McLeod and PhD student Nick Brettell attended the 35th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing at Monash University Melbourne, 5-9 December, and contributed talks 'Homotheties in Minkowski planes', 'Graph connectivity in the streaming model' and 'Removing elements relative to a minor and a fixed basis', respectively. Jeanette went on to a research visit to Brendan McKay at the Australian National University in Melbourne.

Visitors

The department welcomed Erskine visitor Jonathan Pitchford, Senior Lecturer in Mathematical Ecology at the University of York, UK. His special field of interest is Mathematical Biology including population dynamics. He was hosted by Alex James.

Recent visitors include: Zeren Gurkan (National Institute of Aquatic Resources at the Technical University of Denmark), Simone Linz (University Tübingen, Germany), Ian Frigaard (The University of British

Columbia, Canada) Kim Plofker (Union College, USA), Agathe Keller (University of Paris, France), Marcia Barbosa (Evora University, Portugal), Ramasubramanian Sharma (Indian Institute of Technology), Alain Franc (UMR BioGeCo, University of Bordeaux, France) Paul Wright (Austin Community College, Texas).

Seminars

Tracy Craig (University of Cape Town) "The Academic Support Programme for Engineering in Cape Town"

Rachael Tappenden (University of Canterbury) "Development and Implementation of Algorithms for Fast Image Reconstruction"

Merrilyn Goos (University of Queensland) and Mike Thomas (University of Auckland) "Transition from School to University Education in Mathematics: New Zealand and Australia Perspectives"

Robert Hannah (Department of Classics, Otago University) "The Antikythera Mechanism: celestial physics or metaphysics?"

Klas Modin (Massey University, Palmerston North) "Generalised Euler Equations and Template Matching"

Govind Menon (Division of Applied Mathematics, Brown University) "Algorithmic Design of Self-folding Polyhedron"

Daniel Stouffer (School of Biological Sciences, University of Canterbury) "The Tragedy of the Commons in Mutualistic Networks"

Charles Semple (University of Canterbury) "Submodular Functions and Optimizing Biodiversity"

Stefan Winkler (Geological Sciences, University of Canterbury) "Glaciers - Good Indicators of Past and Present Climate Change?"

Douglas S. Bridges (University of Canterbury) "Permuting series, and computing projections"

Ian Frigaard (University of British Columbia) "Math in the Mud?"

Phil Wilson (University of Canterbury) "Bodies Clashing in Fluids"

Michael Pauley (University of Western Australia) "Cubics and negative curvature"

Maarten McKubre-Jordens (University of Canterbury) "Critical Phenomena and Distortion Functionals"

Richard Brown (University of Canterbury) "Numerical techniques for simulating cerebral blood-flow autoregulation ODE systems on a large-scale binary tree network"

Günter Steinke

MASSEY UNIVERSITY

Institute of Information and Mathematical Sciences (IIMS), Albany

We are very sad to report that Mrs Sarah Daniel-Nield passed away suddenly on November 1, 2011 at North Shore Hospital. Sarah had been the Institute of Information and Mathematical Sciences receptionist for just over a year and was respected and liked by all.

Robert McKibbin received the 2012 ANZIAM (Australian and New Zealand Industrial and Applied Mathematics group) Medal for his lifelong work in applied and industrial mathematics. The medal, awarded biennially, is the premier award for Applied and Industrial Mathematics in our region. Abridged from Massey University's website: "Robert McKibbin is one of the pre-eminent applied mathematicians in New Zealand, with a particular focus on geophysical and industrial applications, from modelling hydrothermal eruptions in areas such as Rotorua and the distribution of volcanic dust from eruptions, to fluid motion and pollution transport in groundwater aquifers, ground subsidence and aluminium and iron smelting. Robert was recognised at the awards ceremony for his contribution to research and enhancing the profile of applied and industrial maths through teaching and mentoring, including supervising more than 20 PhD and masters students."

Mick Roberts was successful in the Marsden Fund, with a project "Predicting the epidemic curve".

Frederick Lam received the Albany Students Association College of Sciences Lecturer of the Year Award. It was the second teaching award to Frederick in 2011—earlier in the year he received the IIMS teaching award for sustained excellence in teaching.

In July 2011, Winston Sweatman went (via Britain) to the International Congress on Industrial and Applied Mathematics (ICIAM). He organised the mini symposium "Symmetric Few-body Dynamics". Within this minisymposium, he presented a talk: "Symmetrical Few-body Systems and the Collinear Four-body Problem". He separately presented a poster: "Full Ionisation in Encounters Between Binary Stars".

Mick Roberts attended the AustMS meeting in Wollongong, October 2011, and presented a plenary lecture "Mathematical models for theevolution and transmission of a virus" as ANZIAM Speaker; and a public lecture "The mathematics of epidemics and pandemics".

Carlo Laing enjoyed his sabbatical at Princeton, surviving Hurricane Irene, the Virginia earthquake and an October snowstorm. He gave seminars at the New Jersey Institute of Technology, Princeton and Drexel, and attended a workshop on Spatio-temporal Evolution Equations and Neural Fields at the Centre International de Rencontres Mathmatiques in Marseille, France. He spent a week visiting the laser dynamics group at the Weierstrass Institute for Applied Analysis and Stochastics in Berlin, Germany, and spent a sobering day at the Sachsenhausen concentration camp. Carlo also visited Rajarshi Roy at the University of Maryland to discuss the possibility of experimentally observing "chimera" states in an optoelectrical system.

Graeme Wake visited the University of Sao Paulo, Brazil at the end of November as an invited speaker and panellist at the Brazilian-hosted International Conference on Mathematical Modelling in Industry. This meeting was held in part to explore the setting up of a nationwide Industrial Mathematics Initiative for Brazil. The meeting was a tremendous success and indications are that the initiative will come to fruition in some form with a further meeting likely to be at the end of 2012. He also briefly visited Santiago, Chile on his way back. Graeme arrived home just in time to deliver his invited (by the NZ branch of ANZIAM) lecture on Mathematics-in-Medicine at the NZ Mathematical Society Colloquium 2011 in Auckland.

Shaun Cooper and undergraduate student Dongxi (Lawrence) Ye attended a workshop on Supercongruences, pi-series and related topics at Nanjing University, China, in December. After the workshop Shaun visited East China Normal University in Shanghai.

PhD student Amjad Ali won the prize for Best Paper Presentation (Mathematics), as well as the award for Best Poster Presentation, at the IIMS Postgraduate Student Conference 2011 held at Albany in October.Also, Amjad got married to Sumaira (also a Maths graduate) - he has had a busy and successful year!

Most of us (Alona, Frederick, Gaven, Graeme, Mick, Robert, Shaun, Winston and several students) attended and gave talks and/or posters at the NZMS Colloquium in Auckland. Graeme Wake gave a plenary lecture and Robert McKibbin chaired the Aitken Prize panel. Sophie Shamailov was highly commended for her poster "The Physiological Function of Respiratory Sinus Arrhythmia" co-authored with Alona Ben-Tal and Julian Paton (University of Bristol). Winston Sweatman was presented with a Fellowship of the NZ Mathematical Society at the Colloquium Dinner and Shaun Cooper received the NZ Mathematical Society Research Award for 2011.

We are sorry to lose Tanya Evans who has left us for aposition at Auckland University. Tanya made an outstanding contribution to our group, and will be sorely missed.

Kerri Spooner has completed her RSNZ Teaching Fellowship while on leave from teaching at the nearby Long Bay College. She spent six months experiencing close at hand current projects being contracted to our Centre for Mathematics-in-Industry. Her projects in included working in teams exploring powder-flow in the Dairy Industry, and expert witness work for a court case involving work-place hazards in an Engineering Factory. She notes that the methodology can only be learnt "by doing" and says her experience will enrich her classroom delivery when she returns to Long Bay College in 2012.

We welcome our new RSNZ Teaching Fellow Malcolm McLean from ACG Parnell College, who is working on a project "Search and Rescue Mathematics". That is, how to find things lost at sea, including bodies, containers and oil.

Compiled by Shaun Cooper

UNIVERSITY OF OTAGO

DEPARTMENT OF MATHEMATICS AND STATISTICS

Otago has one of the world's top 100 mathematics departments according to the 2011 QS World University Rankings by Subject. Otago scores particularly well for citations per faculty member.

Iain Raeburn and Astrid an Huef have been awarded a Marsden Grant for $585,000 over three years to study equilibrium states in operator-algebraic dynamical systems. Congratulations, Iain and Astrid, on your great achievement!

Congratulations to John Harraway, who has been elected President of the International Association for Statistical Education (IASE) for the next two years. This organisation, which has about 400 members in 50 countries, seeks to promote, support and improve statistical education throughout the world at all levels from elementary school through to the training of professionals.

We welcomed Matthew Parry in October as a permanent academic staff member, see 'New Colleagues' section.

Since the last Newsletter, we have farewelled Assistant Lecturer Ross Haines and Postdoctoral

Fellow Luke Bennetts. Ross attained the 2011 Woolf Fisher Scholarship and will study at Oxford University for a DPhil, using statistics to research how the English language has evolved over time. Luke, who has worked with Vernon Squire, went to the University of Adelaide.

Boris Baeumer and Misi Kovács were invited speakers at the Hot Topics Workshop on Laplace transform methods and their applications in Daejeon, South Korea, on November 1-5. Boris presented a talk entitled "Fractional differential equations on bounded domains" and Misi gave a talk entitled "A fully discrete approximation of a class of stochastic Volterra equations" and the tutorial "An introduction to infinite dimensional stochastic analysis".

Astrid an Huef and Iain Raeburn visited the University of Victoria, Canada, from the end of August to the end of September to carry out research with their collaborator Marcelo Laca on phase transitions in operator-algebraic dynamical systems. Astrid also visited the University of Aberdeen, Scotland, to work with her collaborator Rob Archbold on quantifying the non-properness of group actions.

Jörg Frauendiener attended the Editorial Board Meeting of "General Relativity and Gravitation" in Heidelberg, Germany, in November.

John Harraway presented a paper entitled "Use of case studies and new software to motivate statistics teaching and learning at school and undergraduate university" at the International Association of Statistics Education (IASE) Satellite Conference on August 18-19. John also was a presenter in the Invited Paper Session (IPS107) at the International Statistical Institute (ISI) World Statistics Congress in Dublin, Ireland, on August 21-26.

Robert Thompson had a collaborative visit to Duke University, USA, in October.

VISITORS

Visitors over the last months have been Ellery Ames (University of Oregon), Torbjørn Ergon (Director of Finse Alpine Research Center, Department of Biology, University of Oslo), Mark Fisher (Monash University), Santiago Gomez (Universidad Nacional de Córdoba), Jim Isenberg (University of Oregon), Philippe LeFloch (Université Pierre et Marie Curie, Paris), Greg Reid (University of Western Ontario), Oscar Reula (Universidad Nacional de Córdoba), László Szabados (Research Institute for Particle and Nuclear Physics, Budapest).

SEMINARS

Bryan Manly (Western EcoSystems Technology, Inc., Cheyenne, Wyoming) "Fisheries marine mammal and bird bycatch in Alaska and Hawaii: observer sampling and the analysis of data"

Ben Martin (University of Canterbury) "Fixed points in spherical buildings"

Mik Black (Biochemistry, Otago School of Medical Sciences) "Big genomic data: are we teaching our students what they need to know?"

Greg Reid (Department of Applied Mathematics, University of Western Ontario) "Introduction to algorithms for algebraic and differential systems"

Astrid an Huef "Algebras associated to higher-rank graphs"

David Fletcher "Bias in estimation of adult survival and asymptotic population growth rate caused by undetected capture heterogeneity"

Philippe LeFloch (Université Pierre et Marie Curie, Paris) "Weakly regular spacetimes with symmetry"

Ken Dodds (AgResearch, Mosgiel) "Gene mapping and genomic selection in sheep using a single nucleotide polymorphism chip"

Aidin Jalilzadeh "Tissue inflammatory response: a computational approach"

Jennifer Brown (University of Canterbury) "Adaptive sampling: my journey that began in the Department of Mathematics and Statistics, Otago University"

Oscar Reula (Universidad Nacional de Córdoba, Argentina) "On the boundary value problem for general relativity: recent advances and open questions"

Peter Green "Sequential analysis and the Moran process"

Mike Hendy "A mathematical excursion into molecular phylogenetics"

Phil Weir "FEM for nonlinear hydroelasticity problems"

Len Cook (Former Director of the Office for National Statistics, United Kingdom and New Zealand Government Statistician) "Politics, place, policy, population and statistics: analysis for hard choices"

John Bryant (Statistics New Zealand) "Bayesian demographic accounts: subnational population estimation using multiple data sources"

Ben Whale "Lorentzian distance, time functions and noncommutative geometry"

Jim Isenberg (University of Oregon) "Ricci flow on complete surfaces"

Aaron Bryant "Bayesian analysis of oncogenic pathway activation"

Mark Fisher (Monash University) "The possibility of magnetically-charged particle-like solutions of the Einstein Yang-Mills Equations"

Jessica Leigh "Modelling horizontal evolution"

Ting Wang (Institute of Natural Resources, Massey University) "Seismicity modelling using hidden Markov models"

Jörg Hennig

UNIVERSITY OF WAIKATO

DEPARTMENT OF MATHEMATICS

We are looking forward to the arrival of two new staff members; one in early January and the other in April/May 2012. The first arrival will be Dr Woei Chet Lim. He is currently a researcher at the Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut) in Potsdam near Berlin. He has previously held post-doctoral positions in the USA and in Canada. Woei Chet's field of research is in mathematical and computational cosmology.

The second new staff member is Dr Daniel Delbourgo who is currently a Senior Lecturer at Monash University. His research interests include number theory, arithmetic geometry, modular forms and elliptic curves, Iwasawa theory, and Galois representations.

The University of Waikato recently held its annual staff golf day. This year, an intrepid team consisting of Ian Hawthorn, Tim Stokes, and Sean Oughton together with Bill Bolstad of the Department of Statistics participated in this event. They won the "hackers" division and came away with the main prize along with other prizes such as ponchos and frisbees.

Sean had a little more travel in the second half of the year. In September there was a one week trip to Bochum, Germany for a workshop on cosmic rays, where he was an invited speaker. And then in December the Annual Fall Meeting of the American Geophysical Union in San Francisco, where he gave another invited paper. Following the meeting he spent 10 days at the University of Delaware.

Nick Cavenagh does not seem to be having much luck in his travels. As reported in the last column, he experienced the excitement of being in the vicinity of a gang shoot-out. Then he visited the University of Queensland for a week in September. Unfortunately, he got food poisoning on the first day which took the rest of the week to get over. We wish him better luck on his travels when he goes on study leave in the first half of 2012.

Stephen Joe visited his former PhD student, Frances Kuo, for two weeks in November at the University of New South Wales. Stephen is a recipient of a 2011 Administrative Excellence Award from the University. Following in Ian Hawthorn's footsteps of two years ago, Stephen was then awarded the Vice-Chancellor's Medal for Staff Excellence.

Seminars

F. Luca (Mathematical Institute, UNAM, Mexico), "Sierpinski and Riesel numbers and their friends".

B. O'Neill, "The solar wind".

N. Cavenagh, "A comparative study of defining sets in designs".

C. Armstrong, "Viscous effects in time dependent magnetic reconnection".

Y. Litvinenko, "Regular and diffusive photospheric flux cancellation".

Stephen Joe

VICTORIA UNIVERSITY OF WELLINGTON

SCHOOL OF MATHEMATICS, STATISTICS AND OPERATIONS RESEARCH, *Te Kura Mtai Tatauranga, Rangahau Pnaha*

No news from Victoria appeared in the NZMS newsletters in 2011, so here's a loosely-chronological summary of what went on, with apologies for all the things I've missed!

We started 2011 by welcoming Eleni Matechou, who joined us for 2011 on a temporary lectureship for one year. Eleni had recently completed her PhD at the University of Kent, supervised by Byron Morgan, and she came to lecture in various Statistics courses plus work with Shirley Pledger and Richard Arnold. After making a great impression and lots of friends in Wellington, Eleni left us slightly early, in September 2011, to take up a lectureship at the University of Oxford. We wish Eleni all the best.

Shirley started 2011 as a full Professor of Biometrics, following her well-deserved promotion the previous year. In June Shirley gave her inaugural professorial lecture, "How many animals are in the area? When counting doesn't work". The focus was on capture-recapture techniques and some of the extensions that Shirley has contributed to that field of study, including work that has been essential to conversation efforts focussed on some of New Zealand's endangered native species.

Several research students were awarded their doctorates during 2011: Jonathan Crook, supervised by Mark McGuinness, on "Ice growth and platelet crystals in Antarctica"; Adam Day, supervised by Rod Downey, on "Randomness and Computability"; Jozef Skakala, supervised by Matt Visser, on "Aspects of general relativity: Pseudo-Finsler extensions, Quasi-normal frequencies, and multiplication of tensorial distributions"; Brenda Sherley, supervised by Megan Clark and Joanna Higgins (Faculty of Education), on "'Kindergarten and New Entrant Teachers' Beliefs and Practices in Mathematics Teaching and Learning"; Gabriel Abreu, supervised by Matt Visser, on "Kodama time, entropy bounds, the Raychaudhuri equation, and the quantum interest conjecture". Congratulations to all of them!

Our congratulations to former postdoctoral fellow Dr Antonio Montalban who worked at Victoria with Rod Downey (supported by the Marsden Fund and NZIMA). Antonio recently got tenure at the University of Chicago and was awarded a Packard Fellowship (the only one in maths in 2011) worth $US875K over 5 years (unrestricted).

A book won as a maths prize at Victoria University in 1944 has come home to our School after it was spotted at a charity bookshop in England. A volunteer at the Oxfam bookshop in Thame, Oxfordshire found the book among others donated from the estate of Professor John Ziman, who grew up in Hamilton and later studied at Victoria. The volunteer contacted the University and posted the book back to New Zealand. As a student at what was then Victoria College, Professor Ziman won the MacMorran Prize, awarded annually to the best second-year mathematics student. He used the prize money to buy The Development of Mathematics by E T Bell, the book that turned up 67 years later. Our Head of School, Megan Clark, said that she was delighted when she was contacted about the book. "It was such a surprise to hear from the bookshop on the other side of the world and I'm delighted they got in touch to see if we would like the book for our archives. John Ziman was well-known in the UK as a physicist and wrote a number of groundbreaking books. What's more, one of our current academics, Professor Rob Goldblatt, is one of his descendants so it really feels like the book has come home." Professor Ziman was elected to the Royal Society, London, and was awarded an Honorary Doctor of Science degree by Victoria University in 1985.

While writing about books, Rob Goldblatt's latest book is "Quantifiers, Propositions and Identity: Admissible Semantics for Quantified Modal and Substructural Logics". This was published during 2011 by Cambridge University Press and the Association for Symbolic Logic.

Estate Khmaladze was elected as a Fellow of the Institute of Mathematical Statistics. This fellowship honours Professor Khmaladze's outstanding research and professional contributions in the field of statistics and probability.

The School signed a Memorandum of Understanding with Statistics New Zealand to strengthen and maintain a partnership. This partnership promotes official statistics and provides summer internships for statistics students from our School.

Dr Petros Hadjicostas joined the School at the end of August 2011. Dr Hadjicostas is a mathematical statistician with a PhD from Carnegie Mellon and he was previously on the Faculty at the Texas Tech University. We're very pleased to have Petros join us, and he has already played a prominent role in helping to organise the Third Wellington Workshop in Probability and Mathematical Statistics, 28-29 November 2011, co-chaired by John Haywood and Ivy Liu. The workshop featured a series of invited presentations and was dedicated to David Vere-Jones, to celebrate his 75th birthday. Further details and photos are available from the web page: http://msor.victoria.ac.nz/Events/WWPMS2011/

One of our 2011 courses, ORST 482 (Official Statistics) has won, jointly with an Ethiopian initiative, the ISI International Statistical Literacy Project 2011 "Best Cooperative Project Award". This award is given once every two years in recognition of outstanding, innovative, and influential statistical literacy projects that affect a broad segment of the general public and are fruit of the cooperation of different types of institutions (national

statistical offices, schools, statistical societies, media, libraries etc.). The 2011 joint winners were:

From Ethiopia, The Belgian (Flemish), Ethiopian and Mozambique universities with the project, "North-South-South (NSS) International Collaborative Project in Biostatistics"; From New Zealand, Statistics New Zealand and NAOS (the Network of Academics in Official Statistics) with the project, "A post-graduate program in official statistics".

As that description suggests, the Official Statistics course had input from individuals at several universities as well as Statistics New Zealand, but the course web page was hosted by our School at Victoria and the local participants were Richard Arnold and Sharleen Forbes.

Matt Visser was awarded a prestigious two year James Cook Fellowship. He is one of two winners nationwide in the mathematical sciences.

Late in September Dillon Mayhew appeared across the nation on the small screen in an episode of the TVNZ7 programme "Ever Wondered", together with Mike Steel (University of Canterbury) and Andy Philpott (University of Auckland). That episode (series 2, episode 9) was on "Maths" and is now available online at http://tvnz.co.nz/ever-wondered/s2-e9-video-4426539

The Hatherton Award for 2011 was awarded to our recent PhD graduate Adam Day for his paper entitled "Increasing the Gap between Descriptional Complexity and Algorithmic Probability" which was published in the Transactions of the American Mathematical Society in October 2011. Adam was the single author of the paper and he worked under the supervision of Rod Downey. Adam also received a prestigious Miller Fellowship to further his studies at the University of California, Berkeley.

Dr Day's paper was published in one of the world's top pure mathematics journals and reports a fundamental contribution to the area of algorithmic information theory, concerned with the relationship between the a priori probability of an event and the event's shortest descriptional length. The author has solved a 26 year old question in the area and the result is regarded by the referees as a tour de force of lasting value and considered a most significant result in algorithmic information theory. The Hatherton Award is presented annually for the best paper in physical, earth or maths and information sciences by a New Zealand University PhD student. It was established in memory of Trevor Hatherton FRSNZ, President of the Royal Society of New Zealand 1985-89, and awarded for the first time in 1997.

Rod Downey has been awarded the 2011 Hector Medal for outstanding work in mathematical and information sciences by a researcher in New Zealand. Professor Downey was awarded the medal for his influential and innovative work in mathematical logic.

Carolyn Chun, one of our postdocs working with Geoff Whittle and Dillon Mayhew on a two-year project funded by an International Research Fellowship from the National Science Foundation, has won the 2012 Kenneth Patchen Award for the Innovative Novel.

Carolyn did a Masters of Fine Arts at the same time as her PhD in matroid theory, and a novel she wrote at that time, "How to Break Article Noun," has won the award, which honours "the most innovative novel submitted during the previous calendar year". Here's a link with further details about the Kenneth Patchen Award: http://www.experimentalfiction.com/Kenneth_Patchen_Award.html

Also, here's another link about the NSF International Research Fellowship which is funding Carolyn's current research on excluded minors for matroid representability over the five-element field: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5179

PhD student Michael Snook was the Conference Chair for the 2011 NZ Mathematics and Statistics Postgraduate Conference, held at Silverstream in late November. Two Victoria PhD students picked up two of the four prizes on offer: best pure mathematics talk was awarded to Ben Clark and Melissa Welsh won the prize for the best applied mathematics talk. Further details concerning the conference are online at: http://msor.victoria.ac.nz/Events/NZMASP2011/

Seminars

For abstracts for these seminars, please enter an appropriately-old date in the School's seminar web page: http://msor.victoria.ac.nz/Events/Seminars

Arkadii Slinko (University of Auckland), "Roughly Weighted Hierarchical Simple Games"

John Maindonald (ANU), joint seminar with the Wellington Statistics Group (a local group of the New Zealand Statistical Association), "Statistical Training or Retraining for the Age of Data Mining, Machine Learning, and Analytics"

Silke Weinfurtner (SISSA, Trieste), "Measurement of stimulated Hawking emission in an analogue system"

Piyush Jain (Edmonton), "Quantum de-mixing in binary mixtures of dipolar bosons"

Thomas Sotiriou (DAMTP, Cambridge), "Teleparallel formulation of General Relativity and local Lorentz symmetry"

Chris Conidis (Fields Institute and University of Waterloo), "Lowness and reverse mathematics"

Avi Berman (Technion: Israel Institute of Technology), "Completely Positive Matrices"

Professor Thanu Padmanabhan (IUCAA, Pune, India), "Lessons from Classical Gravity about the Quantum Structure of Spacetime"

Bei-Lok Hu (University of Maryland), "Emergent Gravity, Spacetime Condensate and Macroscopic Quantum Phenomena"

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

Estate Khmaladze (VUW), "Some new research topics: a short review"

Robert Thompson (Otago University), "Electromagnetic Cloaking and Dielectric Analogue Space-Times"

Reception for Professor Roy Kerr CNZM, organised by Matt Visser (VUW)

Graeme Wake (Centre for Mathematics-in-Industry, Massey University Auckland), "Calculus from the past and at a distance"

Michael Snook (VUW), "The Complexity of Deletion Problems for Graphs and Matroids"

Peter Nelson (University of Waterloo), "Growth Rates in Minor-Closed Classes of Matroids"

James Oxley (Louisiana State University), "Communicating Mathematics"

Adam Day (VUW), "Understanding neutral measures"

Lynette Hunt (University of Waikato), "Model Selection in the Multimix Class of Mixture Models"

Jiancang Zhuang (Institute of Statistical Mathematics), "Stochastic Reconstruction for Spatiotemporal Branching Processes"

Marta Szachniuk (Poznan University of Technology), "OR for RNA three-dimensional structure modeling"

Steffan Berridge (Man Group, AHL), "Inefficient Markets Hypothesis: Exhibit A"

Geoff Whittle (VUW), "Matroids and the synthetic a priori"

Julio Cesar Pereira (Universidade Federal de Sao Carlos, Sao Paulo, Brazil), "Comparing the methods to estimate indices of the catch per unit effort using Bayesian geostatistics"

Xihong Lin (School of Public Health, Harvard University), Visiting Maclaurin Fellow of the NZIMA, "Variable selection and estimation with the seamless-L0 penalty for independent and longitudinal data"

Catherine Cleophas (Berlin Free University), "Re-engineering Customers - Agent-based Simulations for Revenue Management"

David Harte (Statistics Research Associates), "More on parent-offspring models for earthquake process"

Iain Aitchison (VUW), "Finitely presentable groups: A concept of genus"

Petros Hadjicostas (VUW), "An introduction to quantum probability"

Matthias Ehrgott (University of Auckland), joint seminar with the Wellington Branch of the Operations Research Society of New Zealand, "Bridging the Gap between Real World Decision Making and Mathematics: Multiobjective Optimisation in Action"

Petros Hadjicostas (VUW), "The Generalized-Euler-Constant Function $\gamma(z)$ and a Generalization of Somos's Quadratic Recurrence Constant"

Maxim Finkelstein (University of the Free State, South Africa), "Understanding the shape of the mixture failure rate (with engineering and demographic applications)"

Maxim Finkelstein (University of the Free State, South Africa), "History-dependent shock models"

Merrilyn Goos (The University of Queensland) and Sergiy Klymchuk (Auckland University of Technology), "Transition from School to University Education in Mathematics: New Zealand and Australia Perspectives"

Kevin McLeod (University of Wisconsin-Milwaukee), "The Milwaukee Mathematics Partnership; challenges, successes and next steps"

John Haywood

FEATURES

New Colleagues

MATTHEW PARRY

Matthew Parry is a physicist turned statistician who has recently been appointed Lecturer in Statistics at the University of Otago. Matt obtained his PhD in theoretical cosmology at Brown University in 1999. After postdoctoral positions at Imperial College London and the University of Munich, he took up a fellowship at the University College London and then the University of Cambridge working on scoring rules in the context of statistical decision theory. Recently, he has been working with Chris Gilligan and Gavin Gibson on the statistical analysis and modeling of the spread of plant diseases, and he is aiming to apply these methods to horticultural and agricultural diseases in New Zealand.

Matt's main interests include decision theory and information geometry, epidemiology, spatiotemporal processes, computational and Bayesian statistics, cosmology, and quantum statistical mechanics.

Forder Lecturer

Professor Geoffrey Grimmett (University of Cambridge) is there year's Forder Lecturer. Geoffrey will be touring New Zealand for three weeks in April. Starting in Dunedin, he'll be working his way up to Auckland visiting Christchurch, Wellington, Palmerston North, and Hamilton on the way. As well as public lectures, he will be giving more seminar style talks on various topics including problems for the clairvoyant demon and stochastic pin-ball. A brief bio from Geoffrey's webpage is given below.

Geoffrey Grimmett was educated at Oxford University before moving in 1976 to Bristol University for his first tenured post. After sixteen wonderful years in Bristol, he moved in 1992 to the Statistical Laboratory of Cambridge University as Professor of Mathematical Statistics. Cambridge remains his base for pursuing probability theory and the mathematics of disordered systems. He is a fellow of Churchill College. His interest in disordered physical systems, including percolation and related processes, was sparked through interaction with John Hammersley, nurtured by Dominic Welsh, and confirmed through the intervention of Harry Kesten.

He has written numerous research articles in probability theory and statistical mechanics, as well as three research books entitled Percolation (1999), The Random-Cluster Model (2006), and Probability on Graphs (2010). With David Stirzaker and Dominic Welsh respectively, he has co-authored two successful textbooks on probability and random processes at the undergraduate and postgraduate levels.

In his spare time, he plays the harpsichord badly, and he travels with family and friends to quiet places of extraordinary beauty, high and low.

Maplesoft and HRS sponsor Student Prizes for 2011 Mathswell Competition

The Wellington Mathematics Association held their annual competition on 30 August 2011 at Queen Margaret College in Wellington. Year 11 students (Form 5) competed in teams of three from 22 schools across the Wellington and Wairarapa regions.

Congratulations to Sam Becroft, Michael Seowa and Mithunan Sathiyandra, winners from Wellington College. Second place went to the host Queen Margaret College, represented by Tamara Jenkin, Shruti Iyer and Divya Patel.

MathWell Winners Wellington College

Mathswell winners from Wellington College from left to right: Sam Becroft, Michael Seowa and Mithunan Sathiyandra.

MathsWell Competition Runners Up Queens Margaret College

Mathswell runners up from Queen Margaret College from left to right: Tamara Jenkin, Shruti Iyer and Divya Patel.

All six student winners gratefully received copies of Student Maple 15 software sponsored by Maplesoft and HRS.

Attending maths teachers snapped up large Math Matters posters. These illustrated the value of Mathematics across industry for their classrooms.

Please contact Glen to discuss similar sponsorship of prizes and resources for your event if you are organising major math competitions in New Zealand.

Teachers can also contact Glen about licensing options to teach maths with Maple, in class or online with Maple T.A.

Maplesoft is a leading provider of high-performance software tools for engineering, science, and mathematics. For more information visit www.maplesoft.com

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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)	.....

.....

Please outline the purpose of this application and how you intend to use the funds (include any appropriate dates)

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

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Other sources of assistance sought/approved:

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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 application for reserach and student travel grants)

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Please attach and include the following supporting evidence to your application:

- For student applicants, a brief supporting statement from your supervisor outlining the relevance of the activity to your studies.
- For non-student applicants, a brief statement of support from your Head of Department.
- A statement outlining the benefit of the activity for which funds are being sought.
- Quotes for flights and accomodation if these are included in the total expenditure.
- Conference details if this application is supporting attendance at a conference including details of any presentation (oral or poster).

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 June and December each year, applications will only be considered at other times in exceptional circumstances.

Application for membership of the NZMS

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

Membership categories:

Ordinary*	$69.50 p.a.	(Full details at nzmathsoc.org.nz)
Reciprocal	$34.75 p.a.	

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

Student*	$13.90 p.a.	For currently enrolled students in NZ
Overseas student	$34.75 p.a.	For currently enrolled students overseas

(15% GST is added to rates for NZ residents.)

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

When paying their subs, members can also:

- elect to make a donation to the NZMS Endowment for Student Support
- pay their ANZIAM subs of $16 ($8 for students)

Please complete below and mail to:

or Fax: +64 (3) 479 8427

John Shanks, NZMS Membership Secretary,
Department of Mathematics and Statistics,
University of Otago, P.O. Box 56, Dunedin 9054,
New Zealand

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

NZMS Application Form

Name: _____ Title: _____

Address: _____

_____

_____

An institutional address is preferred

E-mail: _____

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

If Reciprocal then complete this: *I am a fully-paid up member of* _____

☐ I am/wish to be a member of ANZIAM and pay its fees at the same time.

Signed: _____ Date: _____

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

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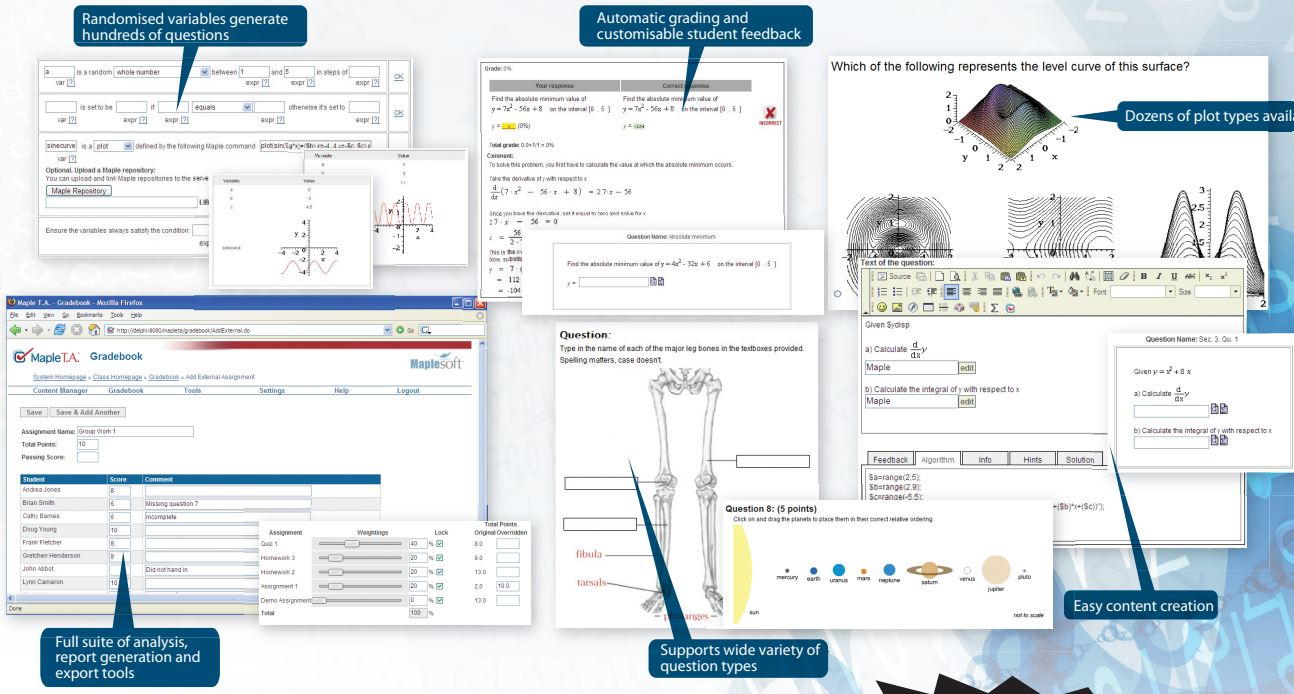

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