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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY

Contents

PUBLISHER'S NOTICE

This newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was edited by Alex James 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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Web Sites

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 newsletter should be submitted as text or LaTeX files to nzmseditor@math.canterbury.ac.nz.

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PRESIDENT'S COLUMN

The inaugural awarding of the Jones Medal, and the formal establishment of reciprocal visiting lectureships with the London Mathematical Society and the American Mathematical Society are certainly some of the highlights for the Society and, more generally, the mathematical sciences in New Zealand in 2010. The fruition of these activities is the result of the collective efforts of recent Councils of the Society.

For the current Council and beyond, one item that requires much consideration is the long-term funding of mathematical research in New Zealand, particularly student travel grants and New Zealand based workshops. These activities have been extremely well funded in recent years. However, the sources for most of this funding are no longer operating or are about to cease. This year the Society spent over $18,000 on activities such as student travel grants and conference funding. This compares favourably with the average $13,000 we spent in the past few years, and we plan to increase our support of New Zealand mathematics even more next year. To sustain and, more importantly, to increase this support will need not just the efforts of the Council but the efforts of everyone working in the mathematical sciences in New Zealand.

MEMBERSHIP

Our total membership is now 305. It is fantastic to see the Society so well supported by the mathematics community. Welcome to the following new members.

New Ordinary Members: Amjad Ali, Florian Beyer, Jonathan Brown, David Bryant, Paul Buckland, Hyuck Chung, Alys Clark, Tiangang Cui, Heiko Dietrich, Graham Donovan, Titiana Evans, Steven Galbraith, Mark Holmes, Astrid an Huef, Robert Krausz, Miguel Moyers-Gonzalez, Andre Nies, Esmaeil Parsa, Kate Patterson, Iain Raeburn, Chris Reid, Igor Rychkov, Michael Paulin, Mark Schroder, Alla Shymanska, Sam Xichen Sun, Robert Thompson, Daniel Turetsky, Ben Whale.

New Student Members: Anuj Bhowmik, Daniel Bertinshaw, Tuan-Yow Chien, Nicholas Duncan, Rami Elbeltagi, Matthew Gibson, Peter Green, Steffen Klatt, Olga Kolokolova, Syaza Abdul Latif, Jacquelyn Parente, Pingyu Nan, Edoardo Persichetti, Agate Ponder-Sutton, Kiri Pullar, Harish Sankaranarayanan, Sepideh Stewart, Chyou Te-yuan, Daniel Turek, V Vasu, Phil Weir.

ACTIVITIES

James Benn, Howard Cohl, Jacquelyn Parente, and Igor Rychkov were awarded travel grants. The Gloria Olive Student Travel Award was awarded to Rachael Tappenden.

We provided grants to Volcanic Delta '11 (Rotorua, 2011), Asian Logic Conference (Wellington, 2011), the NZMS Colloquium (Dunedin, 2010), the New Zealand Mathematics and Statistics Postgraduate Conference (Westport, 2010), the New Zealand Mathematics Olympiad team, and the New Zealand Journal of Mathematics.

The Forder Lecturer for 2010 was Professor Ben Green (University of Cambridge). His talks ranged from adding prime numbers to approximate polynomials. Unfortunately for Ben, he awoke from his first night in New Zealand to the Christchurch earthquake. Despite the shaky start, his lecture tour was an outstanding success and highlighted once again the benefit of such tours to New Zealand mathematics and the wider community.

From 2011, a reciprocal arrangement is now in place with the London Mathematical Society (LMS) whereby, alternating with the Forder Lecturer, every second year a New Zealand based mathematician will visit the United Kingdom. Called the Aitken Lecturer, the inaugural recipient will be announced at this year's Colloquium. The expanded scheme is to be funded by the NZMS and the LMS.

Following the success of the Forder Lecturer, the Council approached the American Mathematical Society (AMS) for a reciprocal exchange of lecturers. In May 2010, we received a very favourable response from the American Mathematical Society to support such an exchange. The initial agreement is for six years. To alternate with the Forder Lecturer, the first visit is to take place in New Zealand in 2011. The scheme is to be funded by the NZMS and the AMS.

NZMS AWARDS

The Aitken Prize for 2009 was jointly awarded to Shannon Ezzat of the University of Canterbury and Michael J Smith of the University of Auckland for their talks "Representation growth of the Heisenberg group over quadratic integers" and "Vibration of floating and submerged elastic plates", respectively. Rachael Tappenden of the University of Canterbury was highly commended for her talk "Compressed sensing: an introduction".

The Early Career Award for 2009 was awarded to Stephen Marsland of Massey University for "his outstanding work in many areas of computational and applied mathematics, including self-organising networks, machine learning, image registration, and generalised Euler equations."

The Research Award for 2009 was awarded to André Nies of the University of Auckland for "his special creativity and highly influential contributions in the area of mathematical logic and in particular its application to questions of computability, complexity, and randomness."

The awards continue to showcase the strength of mathematics in New Zealand. Thank you to the Aitken Prize panel and the awards committee.

JONES MEDAL

The Jones Medal for 2010 was awarded to John Butcher of the University of Auckland. Awarded for the first time this year, the Jones Medal is "for lifetime achievement in the mathematical sciences".

Over the past half century, John Butcher has established himself, not only as one of the most internationally acclaimed New Zealand mathematicians, but also as one of the most important leaders of mathematics within New Zealand. His research on numerical methods for the solution of differential equations is regarded as some of the best work ever done in this area, and has stood at the forefront of international research for over thirty years. John's research has earned him a wide range of top international prizes, including the prestigious Fellowship of the Society for Industrial and Applied Mathematics (the only New Zealander ever to be elected). He supervised the very first PhD student in Mathematics at the University of Auckland and subsequently supervised 16 other PhD students, many of whom hold prestigious positions worldwide. John was a founding member of this society and its second president, and was the first editor of the Mathematical Chronicle, the journal which later became the New Zealand Journal of Mathematics.

Vaughan Jones, after whom the medal is named, presented the award to John at the 2010 Research Honours Dinner in Christchurch on 10 November. The medal was designed by Marian Fountain, a New Zealand sculptor living in France, and incorporates symbolism and mathematical elements. The front of the medal is decorated with a knot and clasped hands. The knot reflects Vaughan's work on knot polynomials for which he was awarded the 1990 Fields Medal. The designer says the hands represent "the measure of thought, direction, patience and clarity required to arrive at a solution." The other side includes binary expansions of e, pi, and the golden ratio, and a nautilus shell. As well as illustrating the golden ratio, the shell "represents all living things in terms of growth, like the fern frond, and in terms of change, like the cusp of a wave".

OTHER HONOURS

Gaven Martin of Massey University, Albany and André Nies of the University of Auckland gave invited lectures, and Bill Barton of the University of Auckland gave a public lecture at the International Congress of Mathematicians in August (ICM2010). Bill's and a colleague's lectures attracted "thousands of students and teachers" and were featured as the cover story of the November 2010 issue of the Notices of the American Mathematical Society.

John Butcher of the University of Auckland was elected a Fellow of the Society of Industrial and Applied Mathematics. He is the first New Zealand mathematician to be awarded this honour. Furthermore, John was awarded the Van Wijngaarden Prize for 2011. Awarded every five years by the Centrum Wiskunde and Informatica (CWI), this prize is awarded to two eminent scientists in the fields of mathematics and computer science.

Estate Khmaladze of Victoria University of Wellington and André Nies of the University of Auckland were elected Fellows of the Royal Society of New Zealand in 2010.

ACKNOWLEDGMENTS

Thank you to John Shanks of the University of Otago for the design and construction of the Society's new website. In addition to the obvious changes, the new design includes the ability to allow specified members of the Society access to the site to modify content and formatting. From personal experience, making such modifications is effortless. A special thank you to Stephen Joe of the University of Waikato for the many (uncountable) years of maintaining the previous site.

Thank you to Alex James for taking over the role of Secretary of the Society and to the rest of the Council for all their efforts this year. A particular thank you to Robert McLachlan for all his help during my first year as President.

Charles Semple
President

LOCAL NEWS

AGRESEARCH

Amy Van Wey gave a talk at the Riddet Institute on the importance of human intestinal bacterial biofilms in nutrition in November.

In August, Zaneta Park was invited to speak at the NZ Next-Generation sequencing conference in Dunedin, and the topic of her talk was "Obtaining high-quality RNA-Seq data — factors to consider". Zaneta later presented a talk discussing Next-Generation sequencing at a Nutrigenomics workshop in Auckland.

Tony Pleasants gave a presentation to the New Zealand Food Safety Authority on the use of predictive microbiology in the export meat industry in November.

John Waller is back at work full-time after heart surgery and reports that he is generally doing well. Chikako van Koten reported the good news that she and her family and property came through the Canterbury earthquake pretty well.

AgResearch also has a new CEO after nabbing the "boy next door", which was our Chairman's description of Tom Richardson, the former CEO of Scion in Rotorua.

Paul Shorten

THE UNIVERSITY OF AUCKLAND

DEPARTMENT OF COMPUTER SCIENCE

Some highlights since the last report:

André Nies gave an invited talk at the International Congress of Mathematicians in Hyderabad, continuing (with Gaven Martin) a recent tradition for NZ started by Rod Downey. Andre and John Hosking have been elected as Fellows of the Royal Society of NZ. John has also been made president of the teaching academy Ako Aoteoroa.

Alexei Drummond was awarded one of the prestigious new Rutherford Fellowships. This enables him to escape from teaching and support his research for 5 years.

Michael Dinneen is planning a sabbatical next year, after 15 years in the department without one, an incredible record of stamina. His colleagues are wondering how they will manage without him. He has a new PhD student from China, working on memetic algorithms.

Mark Wilson is involved in organizing a workshop 13–22 December (with Arkadii Slinko) hosted by the Centre for Mathematical Social Sciences at UoA, of which he is currently the acting director. The Centre received internal cross-faculty funding for this and hopes to run a summer workshop every year. Mark had a two-week trip to Europe in September, giving talks at universities in Brussels, Louvain-la-neuve, Maastricht, Villetaneuse (outskirts of Paris), and attending the COMSOC 2010 meeting in Dusseldorf. He has recently had the wonderful and rare experience of supervising an undergraduate project which solved an open research problem.

Bakh Khoussainov has won a Marsden grant this year. He has co-organized a DIMACS workshop (Rutgers University) on exotic constructions in group theory.

SELECTED SEMINARS

Gerald Weber "Abstraction Layers within the User Interface"

Mark Wilson "What is Computational Social Choice?"

Bob Doran "What I Did on My Holidays"

Fuad Tabba "Adding Concurrency in Python Using Transactional Memory"

Masoud Khosravani "Hardness of Approximation and Integer Programming Framework for the Spanning Caterpillar Problem"

Frank Stephan "Automatic Structures and Model Theory"

Alexander Melnikov "Exotic properties of computable abelian groups"

Thomas Forster "Yablo's Paradox"

Michael J. Dinneen "The Evolution of P Systems, to Hyperdag P Systems, to P Modules"

Helmut Schwichtenberg "Proofs and computations"

Rosemary Ke "State complexity of regular languages"

Andre Nies "Borel structures"

Aniruddh Gandhi "Efficient algorithms that solve games on trees"

Reinhard Klette "Efficient Solutions of Euclidean Shortest Path Problems in Euclidean Space"

Gisela Klette "A New Algorithm for Calculating the Relative Convex Hull "

Mark Wilson

DEPARTMENT OF ENGINEERING SCIENCE

Incredibly it's time to write another column for the NZMS newsletter again. While the last few months have been rather quiet on the seminar front, many other activities have been going on, as you can see if you read on. These past few months have been very successful for the Department and many staff have something to celebrate over the summer break.

STAFF SUCCESSES

Don Nield: The journal *Transport in Porous Media*, published by Springer, has appointed a panel of seven Associate Editors. Don Nield has responsibility for the heat and convection area, and Margot Gerritsen, formerly on our staff but now at Stanford University, is dealing with manuscripts involving numerical methods.

According to data in the Web of Science data base, Don Nield now has a Hirsch index h = 25 (or 27 if one counts a book and a book chapter). This puts him more or less level with the University of Waikato mathematicians Ernie Kalnins (h = 26) and Ian Craig (h = 24). Don asks: Does any other NZ mathematician possess an index greater than 20?

Rosalind Archer and Edmund Crampin: In the recent promotions round at the University of Auckland both Rosalind Archer and Edmund Crampin have been promoted to Associate Professor effective February 2011. Congratulations to Rosalind and Edmund for their achievements.

Richard Clark and Matthias Ehrgott: Staff in the department have been successful in the 2010 Marsden round. Richard has been awarded a fast start grant for his project "A novel approach for probing unsteady boundary layer separation" and Matthias won a full grant for a project entitled "Multiobjective Network Equilibria — From Definition to Algorithms".

Poul Nielsen: Associate Professor Poul Nielsen has received a James Cook Research Fellowship in Engineering Sciences and Technologies for 2011–2012. The award covers full salary for two years and will allow Poul to concentrate on his research. James Cook Fellowships are administered by the Royal Society of New Zealand on behalf of the Government, and are widely regarded as New Zealand's most prestigious Science and Technology awards. Only six of these particular fellowships have been awarded, four of them to DES staff.

Laxman Sunkari: Laxman has been given a permanent job within the faculty IT team and will be complementing the IT staff looking after the department.

CONFERENCES

Departmental staff were heavily involved in organising conferences in recent months. Matthias Ehrgott, Andrew Mason, Michael O'Sullivan, Andrea Raith, and Cameron Walker were the organisers of the 45th Annual Conference of the Operations Research Society of New Zealand. This was a very successful event with a full programme of 52 presentations and 72 attendees, including visitors from Australia, India and Singapore. The programme and proceedings volume including about 40 full papers is available at https://secure.orsnz.org.nz.conf45.

Rosalind Archer, John Cater and Richard Clarke served on the organising committee of the 2010 Australasian Fluid Mechanics Conference held in Auckland early in December. More information about this conference is at http://www.17afmc.com/17afmc/index.cfm?p=about_auckland.

SEMINARS

Judah Ari-Gur (Western Michigan University) "Blast Response and survivability of aircraft structures"

Kevin Ross (University of California at Santa Cruz) "Real-time scheduling of the national airspace in USA"

For more information about the department have a look at the recent DES newsletter at `http://www.des.auckland.ac.nz/uoa/home/for/alumniandfriends`.

GOODBYE

In my first contribution (August 2008) I wrote about the new Head of Department, Andrew Pullan. Three years have passed and Andrew's term is coming to an end. He has been an excellent Head of Department, and how he could start so many new initiatives for the department is something that will remain a mystery to me. Who will be the new HoD? was the question discussed in many a conversation among students and staff. Well, it will be me, and as I step into the new role, I will leave behind some

of the things I've been doing in the past, among these being correspondent of the NZMS Newsletter. So this is my last contribution. I hope you found my contributions to be of some interest, and will continue to read the DES news by my (still to be appointed) successor.

Matthias Ehrgott

DEPARTMENT OF MATHEMATICS

Hannah Bartholomew will leave us in February, to take up an appointment at Sheffield University.

Bill Barton gave two public lectures at the 2010 ICM in Hyderabad in India. Fifteen hundred senior school students assembled in the enormous Global Peace Auditorium, with a warm–up act involving 40 minutes meditation. After that, Bill spoke on "Where is Mathematics Taking Me: An Exciting Ride into the Future", following which he was mobbed by his enthusiastic fans.

Then, at three days notice, he spoke to 250 Undergraduate College lecturers on "Why Mathematics Teachers are like Sachin Tendulkar" (a cricketer) — and again he was mobbed by his audience. A fuller account is given by Bill Casselman, "The Public Lectures in Hyderabad", *Notices of the AMS* vol.57 No.19 (October 2010), 1276–1277, with Bill on the front cover. Bill is quoted as saying that...

"the idea of a mathematics rock star is one I'm still coming to terms with — but I know it is unlikely to be repeated in my own country!"

After those hectic events in Hyderabad, Bill gave two invited presentations in Brisbane at the Australian Mathematics Society Meeting, one in the Mathematics Education strand, and another at the satellite Workshop for Lecturers.

John Butcher was the Invited keynote speaker at the conference on "Problems of Cybernetics and Informatics" at Baku, Azerbaijan, on September 8–9. And John is the recipient of the Van Wijngaarden Prize in mathematics for 2011. That prize is awarded every five years by the Centrum Wiskunde & Informatica (in Amsterdam) to two eminent scientists, one each in mathematics and computer science, engaging in a field of research related to CWI. And on November 10 the RSNZ awarded to John the inaugural Jones Medal for lifetime achievement in the mathematical sciences. Vaughan Jones (in whose honour the medal has been established) presented that elegantly-designed medal to John, together with a prize of $5000 from the NZMRI. Vaughan credited John for his many achievements, and in particular for his contributions and stimulus to what Vaughan regards as the "golden age" of mathematics in New Zealand.

John has received very many congratulatory messages, including this message from Chris King (in Tibet): "John eminently deserves this award, not

because Marston, James, Vaughan or anyone else put him up to it, nor because he was foolish enough to appoint me (and many others) to a teaching position, but because he has been the creative mainstay of mathematical sensibility, intellect and conscience throughout most of the Department's critical history and development, and the country's mathematical maturation, for at least a generation — Vaughan's 'golden age' if you like!".

This photograph shows Vaughan explaining to John the symbols on the Jones Medal.

Bruce Calvert has retired, but he keeps a base in the Department.

Marston Conder has been appointed by the Tertiary Education Commission as one of the three moderators for the 2012 PBRF quality assessment exercise. Also his portrait (commissioned by the Royal Society of New Zealand to commemorate his Presidency of the RSNZ Academy) has been completed, and it is now on display at Science House in Thorndon, Wellington.

Steven Galbraith served on the programme committee for the conference CT–RSA 2011 (Cryptography Track, RSA conference), to be held at San Francisco in February 2011. And in October 2010 he gave an invited lecture on "A Survey of Pairing–Based Cryptography", at the Workshop on "Information Security, Visualization, and Inverse Problems, on the basis of Optimization Techniques", in the Forum "Math–for–Industry", held at Kyushu University, Japan.

Sina Greenwood is organizing the 12th Devonport Topology Festival for 2011, with the invited speakers Jan van Mill and Sergio Marcias. That will be a one–day mini–conference: further information (including the date) can be obtained from Sina.

Gordon Hookings's 90th birthday was celebrated in the Department on October 22. In 1948 Gordon joined the Department of Mathematics at Auckland University College (of the University of New Zealand), and he continued to work as Secretary of NZ Mathematical Olympiads until June 2010. The following photograph shows Gordon and Margaret, with Ganesh Dixit and Ivan Reilly.

Alastair McNaughton's paper (with David Ryan) on "Adjacency branches used to optimize forest harvesting, subject to area restrictions on clearfell" (*Forest Science*, vol.54 No.4 (2008), 442–454) won them the 2010 Best Publication Award in Forestry. Alastair attended the Institute for Operations Research and the Management Sciences (INFORMS) conference and annual meeting at Austin, Texas, on November 7–10. David Ryan is the Deputy Dean of Engineering, and so he was not able to attend that meeting. Accordingly, Alastair delivered their invited joint paper on "Branching techniques for constrained forest harvesting". INFORMS is the main international OR research network, and *Forest Science* is the top academic journal for forestry research. The award was made by ENRE, the Section on Energy, Natural Resources and the Environment. In essence this award was recognizing that Alastair and David had written the best research article on forestry matters in the world during 2008, which made that conference a very special occasion for them. The conference was as always very stimulating, with an abundance of top academic contacts. The papers were varied and of high interest. Alastair particularly enjoyed meeting and chatting with people whom he had previously only known through their research writings. He found Austin to be a lovely city. He enjoyed the art galleries, the museums, a ride in a Greyhound bus out into the Texas countryside, a visit to a vibrant church programme and a couple of evenings crouching under the Congress bridge watching the bats. Alastair returned to Auckland bearing a pair of elegant plaques, each naming Alastair and David as the winners of the 2010 Best Publication Award. This photograph shews Alastair receiving his plaque from Prof. Tapas Dass, the president of ENRE.

Greg Oates and Judy Patterson have been promoted from Senior Tutor to Senior Lecturer.

Maxine Pfannkuch has held a joint appointment to the Departments of Mathematics and of Statistics, but now she is transferring to the Department of Statistics. Maxine will remain a member of the Mathematics Education Unit, and she will continue to teach some graduate courses in the Department of Mathematics.

Philip Sharp has been awarded a development award for time on the BlueFern computer system at the University of Canterbury. The time will be used to perform simulations of the Sun, planets and a large number of asteroids. The aim of the work is estimate the number of asteroid impacts on Earth during the early Solar System.

Arkadii Slinko received a grant of $18,200 at the last meeting of the UoA Research Committee. That is the result of his application to the Cross–Faculty Research Fund, on behalf of the Centre for Mathematics in Social Sciences as the Director of that Centre. This grant is primarily to fund the Summer Workshop organized by the Centre from 2010 December 13–22. The Workshop will have four main topics discussed: Simple Games and Secret Sharing (organizer Arkadii Slinko), Cryptography (organizer Steven Galbraith), Comparative probabilities and simple games (organizer Arkadii Slinko) and Uncertainty, Ambiguity and Choice (organizer Matthew Ryan). Morning talks will be accompanied by afternoon discussions in small groups. Arkadii is an associate investigator in a team (with principal investigator V. Estevil–Castro) which has received an Australian Research Council Discovery grant of A$210,000 for their project on "Algorithmic engineering and complexity analysis of protocols for consensus", for 2011–2013.

Arkadii is now on sabbatical leave, which so far has included: 1. Moscow: The 10th International Meeting of the Society for Social Choice and Welfare, Moscow, Russia, 2010 July 21–24, where he presented four talks, jointly with his former student Shaun White (University of Washington), his current PhD student Tanya Gvozdeva, Piotr Faliszewski (AGH University of Science and Technology) and Edith Elkind (Nanyang Technological University). He visited the Higher School of Economics from July 26–August 18, with host Prof. Fuad Aleskerov. 2. Singapore: Visited Nanyang Technological University (Singapore) from August 19–October 30, with host Prof. Edith Elkind. Participated in the 3rd Computational Social Choice Workshop (COMSOC–2010), Dusseldorf, Germany, September 13–16, giving three talks jointly with his current PhD student Tanya Gvozdeva, Lane Hemaspaandra (University of Rochester), Piotr Faliszewski (AGH University of Science and Technology) and Edith Elkind (Nanyang Technological University). 3. Japan: Visited the University of Tsukuba, with host Prof. Mamoru Kaneko, November 1–30. Lecture at Gakushuin University (Tokyo), host Prof. Dimitry Rtischev, November 12. Invited talk at Tokyo Technological University, with host Prof. Shigeo Muto, November 19. Participated in the Workshop on Inductive Game Theory and Related Topics at Tsukuba, November 26–28.

The algebraist Dimitri Leemans, at Université Libre de Bruxelles, has accepted our offer of a Chair in Mathematics, and he will be arriving at Auckland in September 2011. This is an excellent result for the entire department, and one that will lend us considerable strength in a number of key areas.

On May 21 Prof. Gil Strang (MIT) gave here a public lecture entitled "Is a random triangle acute or obtuse?". That lecture is now available online, at http://mediastore.auckland.ac.nz/library/public/Maths_Triangle_Lecture.m4v.preview.

In September Prof. Ben Green FRS, the Herschel Smith Professor of Pure Mathematics at the University of Cambridge, toured NZ as the 2010 Forder Lecturer of the London Mathematical Society — the last to come under the original arrangement between NZMS and LMS. He arrived in Christchurch on September 4 and registered at a motel, with a colleague from California. Fortunately, the Darfield earthquake did not cause anything to fall off the wall in that suite, and the Californian provided very timely advice on what to do during an earthquake. The Forder Lectures scheduled for the University of Canterbury had to be

cancelled, and so Ben Green went immediately to Dunedin to deliver his lectures at Otago University. He came to Auckland to give his public Forder Lecture on "Adding Prime Numbers" (September 21) and his Forder Seminar on "Arithmetic Progressions of Primes" (September 23), with a lecture at Massey University — Albany on September 22. When he arrived here he was given some Forder material, including the last spare copy of the Forder Festchrift volume **A Spectrum of Mathematics** (edited by John Butcher, Auckland University Press & OUP, 1971), Forder's expository volume **Geometry** (Hutchinson's University Library, 1950) and Forder's booklet **Coordinates in Geometry**, (Auckland University College, Bulletin No.41, Mathematics Series 1, 1953), which explains the construction of coordinates within projective geometry. In an NZIMA interview, Ben Green told that he "particularly enjoyed learning about Henry Forder, the Chair of Mathematics at the University of Auckland whose endowment founded this lectureship, and whose Euclidean geometry tied in with Green's work" (Patterns in prime numbers, *NZIMA IMAGES*, October 2010, p.7). I can imagine how delighted Henry Forder would have been, to find his work on projective geometry being eagerly welcomed by a leading researcher on prime numbers.

Our PostDoctoral Fellow Heiko Dietrich and his wife Steffi (in our Office) are celebrating the birth of Max, on September 10. Max arrived with weight 3735gm and length 55cm. Baby, mother and father are doing well.

Recent visitors include: Prof. Garth Dales (University of Leeds), Dr. Charles Eaton (University of Manchester), Dr Hans Feichtinger (University of Vienna), Prof. Tomas Gedeon (Montana State University), Prof. Harry Gingold (West Virginia University), Prof. Frank Lübeck (RWTH Aachen), Dr Dan Popovici (Université Paul Sabatier, Toulouse), Dr Hendrik Vogt (Technical University Dresden), Dr. Tim Williams (Bristol University) and Prof. Jaroslav Zemanek (Polish Academy of Sciences).

Shawn Means has passed his PhD oral exam, subject to specified minor corrections. Edoardo Persichetti won the prize for "Best Pure Mathematics Presentation" at the NZ Maths and Stats Postgraduate Conference, held at Westport in November. A paper co–written by our PhD students Aishikin Adam and Willy Alangui got featured on the cover of the latest issue of *For The Learning of Mathematics*, which is regarded as one of the top 5 mathematics education journals.

SEMINARS

Gil Strang (MIT) "Is a random triangle acute or obtuse?" (Public Lecture).

Primoz Moravec (University of Ljubljana) "Unramified Brauer groups of finite groups".

Robert Valkenburg (IRL) "Applications of geometric algebra".

Hans Feichtinger (University of Vienna) "Banach Frames in the context of Banach–Gelfand Triples".

Andre Nies (Dept. of Computer Science) "Random objects, and objects of low complexity".

Edoardo Persichetti "Public–key cryptography based on error–correcting codes".

Shawn Means "Spatio–temporal calcium dynamics in the interstitical cells of Cajal".

John Duncan (University of Cambridge) "Monstrous moonshine and quantum black holes".

David Gauld "Engulfing and flows on manifolds".

Jari Kaipio "REAL applied maths can only be done with a safety helmet on".

Tom ter Elst "Does diffusion determine the drum?".

Tomas Gedeon (Montana State University) "State–dependent delays in gene regulation".

Hendrik Vogt (Technical University Dresden) "Stability of heat kernel estimates under perturbation by potentials".

Teemu Luostari (University of Eastern Finland) "Computational modelling of time–harmonic wave propagation" (minicourse).

Sina Greenwood "Homeomorphisms on continua".

Ilze Ziedins (Dept. of Statistics) "Capacity allocation and rostering for an intensive care unit".

Jaroslav Zemanek (Polish Academy of Sciences) "Ergodic theory for holomorphic mappings".

Timothy David (University of Canterbury) "The challenge of multiple scales in the biological sciences: applications in cerebro–vascular perfusion".

Ben Green F.R.S. (University of Cambridge) "Adding Prime Numbers" (Forder Public Lecture), and "Arithmetic progressions of primes" (Forder Seminar).

Mirian Tsulaia (University of Liverpool) "Higher–spin gauge theories in various dimensions".

Florian Pfender (University of Rostock) "Variations on Turan's Theorem".

Alice Devillers (University of Western Australia) "On graphs with lots of symmetry".

Dimitri Leemans (Universitè Libre de Bruxelles) "A journey through polytopes".

Rosalind Archer (Dept. of Engineering Science) "Petroleum reservoir flows: the dark side of a parabolic equation".

Marston Conder "The smallest regular (flag–transitive) polytopes in all dimensions".

Angela Tsai "Two–derivative Runge–Kutta methods for stiff problems".

Rachel Fewster (Dept. of Statistics) "A random sample of research in statistical ecology".

Qing Zhang (Massey University) "Two elliptic–generator Kleinian groups".

Bill Barton "Essential oils & massage: designing a therapy for MATHS 208".

Garth Dales (University of Leeds) "The hyper–St onean cover of a locally–compact space".

Keith Rudell & Simon Youl "Generic sets and the continuum hypothesis; Russell's paradox: what is it and how do we kill it?; Poincaré's inequality on bounded Lipschitz domains".

Heikki Junnila (The University of Helsinki) "D–spaces and thick covers".

Nazli Uresin "On the converses of the Banach fixed–point theorem, and some related results".

Afshin Mardani "A sufficient condition for topological spaces to be ω_1–squat".

Charles Eaton (University of Manchester) "Recognising nilpotent blocks".

Frank Lübeck (RWTH Aachen) "Constructing characters and representations of finite groups of Lie type".

Garry Tee

DEPARTMENT OF STATISTICS

Chris Wild, Maxine Pfannkuch, and Matt Regan were at the forefront of the international celebrations of World Statistics Day in London on 20.10.20-10. They were selected to present the keynote paper for the day's meeting of the Royal Statistical Society, along with co-author Nick Horton, who spent several months in Auckland in 2008. Their paper will be the showpiece for the RSS's launch of the international "GETSTATS" 10-year Statistical Literacy Campaign. Their talk was entitled "Towards More Accessible Conceptions of Statistical Inference", and is now being formulated into a discussion paper which will be published in the Journal of the Royal Statistical Society, Series A.

There must be something in the water... Wayne Stewart has also been invited to give a Plenary Address at a premiere Statistics Education forum: at USCOTS 2011 in North Carolina. About 500 attendees are expected, and there's little doubt that Wayne will enthrall them with the antics of Freaky and Tom, his ventriloquist's dummies who suffer from a chronic disagreement about the foundations of statistical inference. Congratulations to Chris, Maxine, Matt, and Wayne, for getting such great platforms to spread the word about statistics education in New Zealand!

Another big congratulations to Paul Murrell, who has been elected as a Fellow of the American Statistical Association for his "outstanding contributions to the statistical profession." Paul joins Chris Wild and Alastair Scott as NZ's only three Fellows — and all jolly good ones, too.

Congratulations also to Russell Millar, who has been invited by the International Biometric Society to be one of the three co-editors of the A* journal Biometrics. Russell holds the daunting responsibility of being editorial representive for the "Rest Of The World", which in IBS-speak means everywhere outside of the US and Europe. We dwellers of the Rest-Of-The-World are stoked to have a Kiwi on the editorial band-of-three, and need I point out that now we all know who to blame if our submitted manuscripts don't make it.

We have had some comings and goings of staff recently. Sharon Browning and Brian Browning have departed to take up Associate Professorships at the University of Washington, Seattle, respectively in Genome Sciences and Biostatistics. Ivan Kojadinovic has returned to his native France to the University of Pau, leaving New Zealand with two children more than he arrived with in 2007. We have a new full-time Statistical Consulting Service, run by Kathy Ruggiero, Kai Xiong, and Jessica Thomas. Our new professor, Thomas Lumley, has just arrived from the University of Washington.

Research grant success includes an HRC grant for over $500K to Patricia Metcalf, for "Predictors of CVD mortality and morbidity in NZ adults"; and a Fast-Start Marsden grant to Mark Holmes for "Random walks in degenerate random environments". (It is to be hoped that the Statistics Department is not the "degenerate random environment" to which Mark alludes!) Mark has also been awarded a Distinguished Visitor Award to fund a trip to NZ by distinguished UBC mathematician Ed Perkins.

Congratulations also to Stephane Guindon, who has won both an Early Career Research Excellence Award, and a postdoctoral award, from the university. Stephane's research is based in the Computational Evolution group, developing methods for studying speciation events using biogeographic and phylogenetic information. The post-doc, Louis Ranjard, has just arrived. We have also welcomed several new PhD students recently.

The Rise of R continues, and with it Ross Ihaka's media profile. Most recently, Ross and R have been profiled by ComputerWorld and Mana magazines, and the Sunday Star Times. If things keep going as they currently R, Ross will have a lot of people to convert when he releases his next language — watch this space!

Drs Lyndon Walker and Derek Law are the latest PhD graduates from our department. Finding himself with time on his hands after finishing his thesis, Lyndon stood for the Auckland Supercity as Future West candidate for the Henderson-Massey Local Board. Several of our PhD students have won prizes at local and international conferences recently — in particular, congratulations to Saddam Abbasi who won a Student Merit Award at the 2010 World Congress on Engineering in London for his work with Arden Miller.

And finally, the surge of baby boys born to department members continues. We have an even more significant p-value to celebrate since the last newsletter! Our running total of births since 2000 is now 25 boys and 4 girls, bringing our p-value to a whopping(ly small) 0.0001 against equal sex ratio! Oh, and welcome to the world Muhammad Abdullah Asad (son of Ali), Austin Cunliffe (son of Rachel), and Theo Briggs (son of Jonathan), excuse us for getting carried away in the excitement of our p-value...

Rachel Fewster

UNIVERSITY OF CANTERBURY

DEPARTMENT OF MATHEMATICS AND STATISTICS

The big event that has to be the first item in this report is the magnitude 7.1 Canterbury earthquake. It struck on September 4 at 4.35am causing damage throughout the city and surrounding areas but, remarkably, no loss of life. There is no doubt the university was extremely lucky with the timing of the earthquake. Although there was some structural damage, no injuries, no collapses, no fires occurred. There was some superficial damage, like a substantial amount of broken glass and more than a million books came off their shelves. The department as a whole fared pretty well. Even after the initial clean-up we are still reminded daily of the damage with holes in our walls.

No matter what the physical damage, the earthquake and its frequent aftershocks, which reached up to magnitude 5.0 and are still on-going, rattled many nerves. The campus was closed for nearly two weeks with a phased return of staff and students. Term 4, which was to start September 6, was delayed for two weeks and shortened by a week. This required a number of changes to the delivery of programmes, a rearrangement of course material and assessment processes and timing.

The earthquake has also meant that we saw some real team effort, and it was a humbling and a very warm experience to see the department pull together and work as one. Special thanks are due to our IT staff, Steve Gourdie and Allen Witt, who spent long hours with the computing system, bringing it back to life and readying for the return of staff and students.

The three photos show the sights staff encountered on their return to the department. The first one shows an ominous sign at the entrance to the university with an eerie absences of cars at a time which should have been a busy term time. The second photo shows a toppled statue in the Bridges of Friendship Garden in front of the department whose paths and bridges embody the famous Königsberg bridges problem. The last one shows the view some of us got when entering our offices!

On a positive note, in this year's Marsden and Fast-Start round two applications from the department were successful. Ben Martin has been awarded a Marsden grant over three years with his project "Geometric invariant theory, complete reducibility and spherical buildings".

Clemency Montelle has been awarded a Fast-Start Marsden grant over three years with her project "The development of computational procedures and numerical tables in Sanskrit mathematics in the second millennium". The grant will allow her to apply her knowledge in arts and sciences to the record of Sanskrit computational tables of the second millennium (about 900 to 1800 AD), a time when Indian cultures encountered the Islamic world and (later) the emergent European societies. The study of these and related topics form a crucial part of mathematics today, especially in fields like cryptography and computing.

Congratulations to Jennifer Brown and Charles Semple on being promoted to Professor, to Günter Steinke on being promoted to Associate Professor, to Chris Price on being promoted to Senior Lecturer over the bar, and to Phil Wilson on being promoted to Senior Lecturer.

Congratulations to Ewan Orr, a Physics student co-supervised by Ben Martin, for successfully defending his thesis entitled "Evolving Turing's artificial neural networks". Ewan will graduate in December.

Congratulations to PhD student Meghan Williams and her partner Justin Tripp on the birth of their first child, a son named Finlay Idris Williams Tripp, 19 hours after the earthquake on 4 September, and to Carl and Tiye Scarrott on the birth of their second daughter, Meredith May Scarrott on Monday 13 September.

Staff changes in the department include the resignation of Jeroen Schillewaert, who has been a departmental Postdoctoral Fellow for 16 months, working with Gunter Steinke. Jeroen headed back to Belgium on the Tuesday after the earthquake. Luckily, he had already cleared out his office before the earthquake hit. Jeroen first went to the University of Ghent for a research visit before taking up a 2-year lectureship at Universite Libre de Bruxelles on 1 October.

Miriam Hodge, a PhD student, and Assistant Lecturer since the beginning of this year, left the department on 15 October to take up a new position in Abu Dhabi. There she will be involved in setting up a new government statistics department for the United Arab Emirates.

The department welcomed Jeanette McLoed, who took up a continuing lecturer position on 15 November. Jeanette came from the University of Bristol, where she held a postdoctoral position, and has research interests in combinatorics and in particular asymptotic enumeration, Latin squares, graph colouring and random graphs.

Blair Robertson took up a 1-year fixed-term lectureship in November. Blair, a PhD student in the department under the supervision of Chris Price and Marco Reale, has been awarded, after submission of his thesis, a publication scholarship by the College of Engineering to submit some of his thesis results for publication, and successfully defended his PhD in November.

Xin Zhao started a 2-year postdoctoral fellowship in November.

CONFERENCES, WORKSHOPS AND VISITS

Erskine visitor, Konstantin Mischaikow organised a workshop on Computational Homology and Dynamics in the department from Friday 11 August to Sunday 13 August. Seven speakers from the USA, Japan and Poland gave lectures on topological methods for analysing data sets that arise from

dynamical systems. The talks, which were aimed at senior undergraduate and postgraduate students, covered applications to gene regulation, neural networks, image processing and fluid flow, as well as the underlying mathematics. The local organisers were Ben Martin, Rua Murray and Mike Plank. The workshop was financially supported by NZIMA and the department.

Clemency Montelle is spending a six-month research sabbatical in India and France. While in India, she co-organised and presented at one of the satellite conferences associated with the quadriennial International Congress of Mathematics (Hyderabad, India) which took place at the Kerala School of Mathematics in Calicut, India, entitled "Mathematics in Ancient Times". In France, she was an invited participant at the meeting Courants Actuels en Histoire des Mathématiques at the Institut de Recherche Mathématique Avancée (University of Strasbourg, France, 21–23 October), and invited speaker at the Wissenschaftshistorisches Kolloquium, Goethe-Universität in Frankfurt, Germany, 26 October, Arithmetic Meets Astronomy: Hypsicles of Alexandria and his Little Work on Rising Times; the Histoire des Sciences, Histoire du Texte Seminar series run by the Rehseis Institute as part of the CNRS, and the Séminaire d'Histoire des Mathématiques at the Institut Henri Poincaré in Paris, giving a talk "Lining It Up: Spatial Liaisons in Sanskrit Computational Sources", 2 November. She is also co-organising and facilitating a week-long international workshop entitled History of Numerical Tables in Sanskrit Sources which is being hosted by IMERA (Institut Méditerranéen de Recherches Avancées) funded by the ANR (l'Agence Nationale de la Recherche), in Marseille, France.

Douglas Bridges had a busy end of year, with three visitors from Sweden and three from Italy all at the same time. Giovanni Sambin, Milly Maietti and Francesco Ciraulo were here from Padova and Palermo, and Erik Palmgren, Viggo Stoltenberg-Hansen and Anton Hedin from Uppsala. All were visiting under the EU Marie Curie IRSES grant for the project "Constructive Mathematics: Proof and Computation". A mini-symposium was held in the Department, 29 November to 4 December.

A meeting, organised by Alex James and chaired by Bill Barton from the University of Auckland, was held 5 November for lecturers, school teachers and educators who are interested in senior secondary school and undergraduate mathematical sciences to discuss a vision document for mathematical sciences education for ages 16–20. The session was a continuation of a two-day conference that was held at the University of Auckland earlier this year as part of an NZIMA–funded workshop to improve mathematical sciences in New Zealand.

James Degnan gave a talk entitled "Identifying Species Trees from Clade Properties" at Phylomania in Tasmania from 4–5 November.

Neil Watson gave a talk entitled "A Unifying Definition of a Subtemperature" at the 54th Annual Meeting of the Australian Mathematical Society at the University of Queensland from 27–30 September.

Phil Wilson attended a Focussed Research Group on Cortical Spreading Depression (CSD) and Related Phenomena hosted by the Banff International Research Station for Mathematical Innovation and Discovery in Banff, Alberta, Canada. CSD is a poorly-understood wave of suppression of electrical activity in the cortex of the brain, associated with migraine with aura, stroke and brain trauma.

Jennifer Brown was one of six invited speakers at the Women in Statistics Conference held on 20 October 2010, World Statistics Day. Her talk was titled "Going green: how statistics helps in how we manage New Zealand's environment". Jennifer also was a keynote speaker on "Adaptive and Unequal Probability Survey Designs for Monitoring Animal and Plant Distributions" at the Palmerston North Statistics conference on 22 October 2010.

Marco Reale organised a session and gave a talk entitled "Long Memory Time Series Sometimes Suffer from Amnesia" at the 4th CSDA International Conference on Computational and Financial Econometrics (CFE 10) at the University of London, and visited to the 3rd University of Rome, 13 November – 16 December 2010.

Charles Semple gave a talk entitled "Submodular Functions and Biodiversity Conservation" at Phylomania in Tasmania, 4–5 November 2010.

Peter Jaksons, Sabariah Saharan, Shannon Ezzat, Joe Zhu, Anna MacDonald and Rachael Tappenden gave talks or presented posters at the NZMS Postgraduate Conference at the Westport Field Station from 22 – 25 November 2010.

Wen Ong attended the 15th Biennial Computational Techniques and Applications Conference in Sydney from 28 November to 1 December 2010 and gave a talk entitled "Reconstruction with Blobby Shapes".

Continues after centrefold ...

A TRIPLE 70th — PROF IAN COLLINS AND PROF MICHAEL O'SULLIVAN

The photo was taken during the Department celebration of Mike and Ian's 70th birthdays as they are cutting their cakes. Mike is on the left (cutting a cake with a picture of Statler and Waldorf on it [the two old men who sat in the balcony seats in the Muppet show]) and Ian is cutting a cake with a 3-sided pyramid on it signifying the triple 70th.

This year saw a very special celebration. Two of NZ's distinguished applied mathematicians, both of the Department of Engineering Science Department at Auckland University, turned 70. Between them, they have a combined 70 years of service within the Department. Ian Collins also served as the Head of Department for 10 years (from 1981-1991) and Mike O'Sullivan performed the same job for 8 years (from 1992-1996 and 2002-2003). Both Ian and Mike are profiled here.

IAN COLLINS

In Ian's own words, he is a "Kentish Man" not a man of Kent. Whilst studying at Cambridge University, he became fascinated with the application of mathematics to the understanding of physical and engineering processes. His first job was working with a submarine propulsion design team at the Admiralty Research laboratory in London, and he was initially horrified to find that he was the only mathematician in the team. However, this experience initiated his lifelong interest in providing mathematical expertise in an engineering research environment. Whilst at Manchester University in the mid-1970s he met both Cecil Segedin and Ian Medland, who were both on leave in the UK, and who told him about the Engineering Science Department (then called TAM — Theoretical and Applied Mechanics). Ian remembers telling his wife, that evening, that there would be a good job in NZ becoming available in a few years. He was fortunate to be appointed Cecil's successor (and Head of Department), in 1981, and his family relished the change in hemisphere.

Ian Collins is a distinguished researcher in the areas of applied mathematics and continuum mechanics. His contributions include solutions to metal plasticity problems, developing the thermomechanical foundations of solid mechanics, constitutive theories for geomaterials, stability of rock slopes, mathematical modelling of testing procedures in geotechnical engineering, and mathematical modelling of manufacturing processes for thermoplastic composites. Ian's sustained contributions to the mechanics

and deformation of granular materials, especially on the effective use of thermomechanics in the derivation of their constitutive models are exemplary. Ian pioneered the applications of a thermodynamic framework for the plasticity modelling of granular materials. He highlighted the superiority of this framework in a series of important papers. His contribution in this area was recognised by the Institute of Civil Engineers, UK, and they awarded him the 2003 James Watt medal. He was subsequently also awarded the Crampton Award (2004) and the Geotechnical Research Medal (2006).

In recent years, Ian has devoted much of his energies to teaching. Students have greatly valued Ian's lecturing style — so much so that they even started a Facebook page in his honour.

MIKE (MICHAEL) O'SULLIVAN

For many in the Department, Mike is synonymous with Engineering Science, and all of his children have, at one stage or another, worked for, or studied in, the Department. Mike can actually claim he was an Engineering Science student before the Department even existed, because he completed a BE (Civil) and a BSc (Mathematics) simultaneously (at Auckland) then went on to an ME in Applied Mechanics, supervised at Ardmore by Cecil Segedin (the founder of the Engineering Science/TAM department). After his ME, Mike went to Caltech and completed a PhD in Applied Mechanics. During his studies at Caltech, Mike started a rugby team, played cricket badly, went tramping and body-surfed at Malibu.

From Pasadena, Mike moved to NYU and took up a job as an assistant professor in Mathematics, teaching mathematical modelling to engineering students. After 18 months at NYU, he was offered a job by Cecil Segedin and returned home to NZ. Apart from a few sabbatical leaves, Mike has remained in the Engineering Science/TAM department since his return in 1969.

Mike's research interests are in environmental fluid mechanics, particularly in computer modelling of geothermal fields and pollution problems in harbours. He has worked with Contact Energy (and its predecessor) for many years on computer models of the Wairakei and Ohaaki geothermal fields. Mike is held in such high regard that Contact Energy have funded a research position continuously for more than 25 years, which has been filled by a variety of Engineering Science graduates over the years. Mike has also worked with PB Power on geothermal projects in Indonesia, Japan, Kenya, Mexico and USA, and with Metrowater on models of contaminant movement in the Waitemata and Manukau Harbours.

Mike has maintained his interest in sport and the outdoors. For many years he was a stalwart of the Department's lunchtime running group, leading to the completion of the Rotorua marathon, together with another staff member, David Ryan (although some distance behind him). This feat stimulated others in the department into similar efforts.

Mike continues to be very productive in teaching, research and engaging with industry. He leads a group consisting of several research fellows and postdocs, and just this year, three of his PhD students completed.

Matthias Ehrgott
Andrew Pullan

Local news continued ...

On 30 September, Mike Steel and Charles Semple were interviewed on Radio New Zealand's Changing World on Mathematical Approaches to Evolution. Hear them on: http://www.radionz.co.nz/national/programmes/ourchangingworld.

VISITORS

Sebastian Boecker is visiting the department from 7 October 2010 to 29 March 2011 to work with Mike Steel. He heads a bioinformatics group at the Friedrich-Schiller University in Jena, Germany. Sebastian has been awarded a Feodor Lynen Fellowship from the Alexander von Humboldt Foundation in Germany. This fellowship is awarded for a German scientist to visit the group of a former Alexander von Humboldt Research Fellow (Mike Steel) and pays 75% of his German salary, with the balance being covered, in this case, via Allan Wilson Centre funding.

James Oxley, Alumni Professor of Mathematics at Louisiana State University and a frequent visitor to the department, was hosted by Charles Semple as an Erskine Fellow, 4 September – 1 December.

Recent visitors include: Koen Struyve (Ghent University, Belgium), David Baird (Ag Research), Allan Wilms (Guelph University, Canada), Helmut Schwichtenberg (Ludwig-Maximilian University, Munich, Germany), Richard Law (University of York, England), Roberto Baragona (University of Rome, Italy), Eldon Bjarki (Oxford University), Dominic Welsh (University of Oxford) Giovanni Sambin, (Universita di Padova, Italy), Milly Maietti (Universita di Padova, Italy), Francesco Ciraulo (Universita di Palermo, Italy) Erik Palmgren (Uppsala University, Sweden), Viggo Stoltenberg-Hansen (Uppsala University, Sweden) and Anton Hedin (Uppsala University, Sweden).

SEMINARS

Thomas Forster (Cambridge University) "Yablo's Paradox"

Koen Struyve (Ghent University) "Projective Lines, Trees, Valuations and Beyond"

Maarten McKubre-Jordens (University of Canterbury) "Infinity in Computable Probability: Logical Proof that William Shakespeare probably was not a Dactylographic Monkey"

Kevin Furlong (Penn State University & UC Erskine Fellow) "Putting the 2010 Canterbury Earthquake into Context: The Why and How"

Geospatial Research Centre Presentation (University of Canterbury) "An Introduction to the Geospatial Research Centre and its Capabilities"

Douglas S. Bridges (University of Canterbury) "Weak-operator Continuous Functionals — Constructively"

Sharleen Forbes (Victoria University & Statistics New Zealand) "New ways of visualising official statistics"

James Oxley (Louisiana State University) "Communicating Mathematics"

John Lewis (WETA Digital) "Applications of Scattered Data Interpolation and Machine Learning in VFX"

John Cleary (University of Waikato) "Surviving Programming in a Parallel World"

Allan Willms (University of Guelph, Canada) "Parameter Range Reduction for ODE Models Using Monotonic Descretizations"

Bill Taylor (University of Canterbury) "Optimal Strategies for Symmetric Win/Loss Games"

Roberto Baragona (Sapienza University of Rome) "A Class of Non-linear Non-stationary Functional Autoregressive Model Building by Genetic Algorithms"

Sebastian Boecker (Friedrich Schiller University, Germany) "Solving Hard Problems in Bioinformatics: Identifying Unknown Metabolites using Tandem Mass Spectrometry"

Stefano Grassi (University of Perugia, Italy) "Topics in Unobserved Components Models"

Helmut Schwichtenberg (Universität München) "Proofs and Programs"

Michael DeGiorgio (University of Michigan) "Explaining Worldwide Patterns of Human Genetic Variation using a Coalescent-based Serial Founder Model of Migration Outward from Africa"

Maarten McKubre-Jordens (University of Canterbury) "Real Analysis in Paraconsistent Logic"

Günter Steinke

INDUSTRIAL RESEARCH LIMITED

Shaun Hendy has been awarded the prestigious New Zealand Association of Scientists Research Medal for his pioneering work in the field of nanotechnology. He received the honour, which acknowledges outstanding fundamental or applied research in the physical, natural or social sciences published by a scientist aged under 40, at a ceremony in Wellington last week. His major research discoveries include identifying new solid-liquid phase behaviour induced from nanoscale collisions, and the classification of novel recoil behaviour of nanoparticles. These new phenomena are absent from both the smaller atomic-scale, and from the larger macroscale. Dion O'Neale hosted Dr Will Wright, who has joint positions at the University of Melbourne and La Trobe University. Dr Wright's visit was funded by an ISAT/BRAP grant from the NZ Royal Society to investigate efficient numerical methods for Heston-type PDEs. The Heston PDE is used in mathematical finance as a generalisation of the more famous Black-Scholes PDE for option pricing. Exponential integrators are one class of numerical methods, well suited to the Heston PDE. It is hoped that, as a consequence of Dr Wright's visit, these integrators can be applied to other PDEs of interest to the IRL Applied Maths group.

Warwick Kissling attended the GeoEn conference in Potsdam, Germany, and gave a talk entitled "Geothermal Energy and Development in New Zealand." He also gave a talk at GFZ (GeoForshungZentrum — the German research centre for Geosciences) following the meeting entitled "Large Scale Convection with a Brittle-Ductile Transition". Warwick also attended the NZ GeoSciences 2010 conference in Auckland in late November.

John Burnell spent a week in Santa Rosa attending a workshop organised by Mighty River Power to assess the technical risks associated with the Ngatamariki geothermal development. John has been working on a model of the Ngatamariki geothermal field for some time, with occasional assistance from Warwick and Dion.

The IRL nanoclusters group (Shaun Hendy, Nicola Gaston, Bridget Ingham, Dmitri Shebarchov, and Krista Steenbergen from IRL, Amanda Parker and Keoni Mahelona from Victoria University along with Andreas Hermann from Auckland University) attended the annual Nanoclusters meeting, which was held this year October 10–12 at the Portage Resort in the Marlborough Sounds. The meeting features experimental, theoretical and computational work being done on nanoclusters throughout New Zealand and included members from Simon Brown's group at Canterbury as well as Richard Tilley's group at Victoria University. Always up for a laugh as well as a challenging tramp, the group was joined by Catriona Sissons (who is working on network models with Shaun) for the 2.5 day, 52 km Queen Charlotte track prior to the meeting.

Nicola and Shaun attended the ISSPIC cluster conference in Oaxaca, Mexico, and presented recent work on clusters.

Lastly, we welcome a number of summer students. Jessica de Ruiter and Steven Stojanovich (VUW) and Jake Martin (Auckland) are working with Nicola Gaston and Shaun Hendy on a variety of problems in quantum chemistry, cluster modelling and fluid flow.

Warwick Kissling

MASSEY UNIVERSITY

INSTITUTE OF INFORMATION AND MATHEMATICAL SCIENCES (ALBANY)

MATHEMATICS NEWS

The mathematics group was delighted to host the Forder Lecturer Ben Green on September 22. Ben's lecture "Adding Prime Numbers" was attended by a large number of staff and students from throughout the university.

Gaven Martin gave an invited lecture "Quasiregular Mappings, Curvature & Dynamics" in the analysis section of International Congress of Mathematicians in Hyderabad, India, August 19 – 27.

Alona Ben-Tal received an NIH grant for 5 years to study the feedback mechanism in the respiratory system. This is part of a larger project aiming at developing a multiscale model of neural control of breathing and involves modellers and experimentalists from the UK, US and New Zealand.

Carlo Laing travelled to the UK in September as an invited speaker at the Progress in Neural Field Theory Conference in Reading. He also attended the OCCAM Computational Neuroscience Workshop on Future Challenges in Mathematical and

Computational Neuroscience, held at St Anne's College, Oxford, and gave a seminar at the University of Manchester.

In early November, Robert McKibbin attended the 21st International Symposium on Transport Phenomena (ISTP-21) in Kaohsiung, Taiwan, as Co-organiser of an Invited Session on Transport Processes in Environmental Flows, and spoke on some aspects of mathematical modelling of aerosol transport by the atmosphere. There were six speakers, from Russia (1), Japan (3) and New Zealand (2). The other NZer was Dr Tammy Lynch (from IFS, Massey University at Manawatu) who presented a paper written jointly with her current PhD student, Luke Fullard, on modelling of hydrothermal eruptions. It turns out that New Zealand is to host ISTP-23 in 2012, at the University of Auckland.

Graeme Wake is continuing to build contacts with Malaysia and various campuses of the Universiti of Teknologie Malaysia. In late November he travelled to UTM (Sabah, Eastern Malaysia) to fulfill the role as Examiner in Mathematics and to look at possibilities of recruiting Postgraduate students from there. Two invited lectures are to be given during his stay there. This is the third country in which he has operated in this role, the previous being Brunei (1991–3) and Oman (1999–2000).

In late August Graeme concluded his term as regional coordinator (Auckland) and Board member of the newly formed Fulbright Alumni Association of NZ.

Several mathematics and statistics staff were nominated for the Albany Students' Association 2010 Lecturer of the Year Awards. Marti Anderson, Alona Ben-Tal, Shaun Cooper, Tanya Evans, Frederick Lam, Barry McDonald, Robert McKibbin and Mick Roberts received certificates and attended a lunch hosted by the Albany Students' Association.

The Albany Mathematics Postgraduate Conference was held on Wednesday October 20. Talks were given by Amjad Ali, Haydn Cooper, Samuel Dillon, Rami Elbeltagi, Steffen Klatt, Nurul Syaza Abdul Latif, Graeme O'Brien and Qing Zhang. The organising committee (Amjad, Haydn and Qing) did a fine job, and the conference was well-attended by staff and students. Amjad received an award for the best talk, and Rami and Samuel also received awards for their talks; with prizes being provided by Wakes' Scientific Consulting and the Albany Students' Association. The judging panel commended all of the speakers for the quality of their talks.

Qing Zhang has passed her PhD oral exam, subject to minor emendations. The thesis, supervised by Gaven Martin, was on the geometry of Kleinian groups and hyperbolic manifolds. The examiners were uniform in their praise of the depth and interest of the results.

Chanakarn Kiataramkul returned to Mahidol University in Bangkok in late August to prepare her PhD thesis for submission in December/January.

STATISTICS NEWS

In March, Marti Anderson hosted a one-week workshop on multivariate analysis for biologists and ecologists, the second to be held here at Massey Albany, with a focus on the computer software PERMANOVA+, which was developed in collaboration with colleagues at Plymouth Marine Lab (PML) in the UK. Similar workshops were also presented by Marti in August in Seattle, Washington, for the National Oceanic and Atmospheric Administration (NOAA) and in June in Plymouth at the home of the Marine Biological Association (MBA) of the UK. The MBA lab looks right out over Plymouth harbour, where Sir Francis Drake defeated the Spanish Armada. Right down the lane are also the stone steps down to the water where Marti's direct ancestor, William Bradford, author of the Mayflower Compact, embarked with his fellow pilgrims to the New World. What goes around comes around, I guess! Marti also took part in a workshop for the analysis of beta diversity at the National Centre for Ecological Analysis ad Synthesis (NCEAS) in Santa Barbara in April. This was the second of three sessions devoted to the topic, with the next one to be held in November.

The other exciting news for Marti, postdoc Dr Mat Pawley, and PhD students Adam Smith and Oliver Hannaford, was the delivery of a brand new 4.3m Naiad rigid inflatable boat (RIB), which is just perfect for diving and counting fish (among other things). While the crew are busy getting together all of the materials for the boat (the list is long — everything from lifejackets to scuba tanks) and brushing up on boating skills, first aid, and other qualifications, an important decision had to be made — what shall we call it? We settled on the name "RV Poisson" (the "RV" bit stands for "Research Vessel"), which seemed only fitting for a craft specially designed to serve marine ecological statisticians!

In August Beatrix Jones hosted Anthony Fiumera from the Biology department at Binghamton University in Binghamton, New York. They are working together on a project to detect genetic variants affecting reproductive success in wild populations of fruit flies (Drosophila melanogaster).

Adam Smith successfully completed his PhD confirmation. Well done Adam! In June, Marie

Fitch presented some of her PhD research at the 'Sparse structures: statistical theory and practice, Research workshop' in Bristol, UK and the WNAR/-IMS annual meeting in Seattle, Washington. Aside from the expected relevant presentations and networking opportunities a highlight was the Bristol conference dinner which was held onboard the SS Great Britain.

Dr Howard Edwards has moved from his old office in the Quad building to an office in the IIMS building with the rest of us, so our group is now all housed in the same place at last. Howard, Beatrix Jones and Marie Fitch have been beavering away on material for an online textbook resource for the stage 1 Business Statistics paper. This project is being co-ordinated by colleagues in Palmerston North and also involves those teaching the paper in Wellington. Marie and student Katharina Parry have also been doing some liaison work with presentations to local schools.

PhD student John Xie has engaged in more family based liaison supporting his son David who was a member of the team of secondary school students who brought a gold medal home from the 23rd International Young Physicists' tournament in Austria. (Well done!)

Finally, a recent important discovery was the ping pong table at Ferguson's, the local pub right here on the Massey Albany campus. Dr Mat Pawley is currently the reigning table tennis champion in the statistics group.

SEMINARS

Ben Green (Cambridge) "Adding Prime Numbers"

Carlo Laing "An Introduction to Uncertainty Quantification"

Gaven Martin "The 2010 Fields Medals"

Mick Roberts "Early estimation of epidemic parameters"

Qing Zhang "Two Elliptic Generator Kleinian Groups"

Shaun Cooper and Marie Fitch

UNIVERSITY OF WAIKATO

The 2010 Forder Lecturer, Professor Ben Green, gave two clear and well-received talks in September.

Ernie Kalnins and Tim Stokes are still on study leave. As reported in the last Newsletter, Ernie was intending to spend about seven weeks visiting Dubna and Armenia in July/August. However, he had to cut short this trip because of the severe heat as well as the choking smog from wildfires. As part of his study leave, Tim attended the 28th Annual Victorian Algebra Conference held at Monash University. He presented a talk titled "Comparison semigroups".

Patrick Noble visited the department for three weeks in November to work with Ian Craig. Patrick is a PhD student in astrophysics from the University of Sydney. Aside from astrophysics, Patrick has interests in stochastic differential equations, computational mathematics, and statistics.

Sean Oughton will be visiting Florence again, this time for a two day workshop on Plasma Astrophysics, followed by a week's worth of collaboration there. After that, he moves on to the University of Delaware for about ten days for further collaboration. He finishes the trip in mid-December with a week in San Francisco at the annual American Geophysical Union Fall meeting. There he will give an oral presentation titled "Transport of solar wind fluctuations: a two-component model".

Yuri Litvinenko is a longer-term traveller. He left at the end of November for a visit to Germany and is not due back until towards the end of next February. Yuri's trip is part of his research fellowship from the Alexander von Humboldt Foundation.

In December, Nick Cavenagh will be spending some time in Australia. Besides visiting collaborators, he will be attending the 34th Australasian Conference on Combinatorial Mathematics & Combinatorial Computing at the Australian National University.

Kevin Broughan attended the International Congress of Mathematicians held in Hyderabad in August. He presented a talk titled "Shifted primes and semismooth numbers". Another traveller in August was Stephen Joe who attended the Ninth International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing held in Warsaw. He presented a talk titled "An intermediate bound on the star discrepancy". The tenth such conference will be held in 2012 much closer to home in Sydney.

Seminars

T. Stokes "Comparison semigroups and function algebra".

Y.X. Chong "Robust portfolio optimisation".

J. Ge "Perfect numbers with identical digits".

V. Mahindra "Financial option pricing—Using Black-Scholes and the Heston PDE to price calls".

B. Green (Cambridge University) "Arithmetic progressions of primes".

B. Green (Cambridge University) "Linear equations in primes".

Stephen Joe

VICTORIA UNIVERSITY OF WELLINGTON

SCHOOL OF MATHEMATICS, STATISTICS AND OPERATIONS RESEARCH, *Te Kura Mā-tai Tatauranga, Rangahau Pūnaha*

It is with great sadness that I start our latest news with a report of the death of Dr Dong Wang, who died unexpectedly on 22 October 2010. His funeral was held on 1 November at the Karori Crematorium, followed by a wake at Victoria University of Wellington. Dong was a friend and lecturer held in very high regard by his colleagues and students. He was never without a smile or laugh, and I think Dong was probably the happiest person you could find. Passionate about his work, but more so about his family and friends, Dong will be deeply missed by very many people. Tributes to Dr Wang can be viewed on http://www.tributes.co.nz/ViewMyTribute.aspx?id=5827.

Fortunately, the remainder of our news concerns much happier events. Shirley Pledger is set for a Happy New Year from the start of 2011, when she formally becomes Professor of Biometrics, a well-deserved promotion. Our Head of School, Megan Clark, deserves thanks for lots of behind the scenes work, since Shirley was pleasantly surprised when the announcement was made!

Stefanka Chukova led the team of Victoria people who ran the very successful 4th Asia-Pacific International Symposium on Advanced Reliability and Maintenance Modeling (APARM 2010) in early December. For further details, including a full conference programme, please see http://msor.victoria.ac.nz/Events/APARM2010/

Eleni Matechou joins us for 2011 on a temporary lectureship for one year. Eleni recently completed her PhD at the University of Kent, supervised by Byron Morgan. She will be lecturing in various Statistics courses and also working with Shirley Pledger and Richard Arnold.

Congratulations to Estate Khmaladze who was elected as a Fellow of the Royal Society of New Zealand. Estate is regarded as a leading international expert in statistical models, making significant contributions in not only theoretical work, but also for statistical problems in finance, insurance and other related fields.

The School has entered into an agreement with the Scuola Internazionale Superiore Di Studi Avanzati (SISSA) in Trieste, Italy to encourage the exchange of staff, researchers and graduate students. This builds on the collaborative research relationship that Matt Visser has long had with SISSA.

Congratulations to Noam Greenberg who won one of ten nationwide Rutherford Fellowships for future stars of New Zealand science. Noam's fellowship is worth $200,000 per annum for five years and will enable him to pursue his research into non-computable objects.

Academics in the School were once again successful in securing Marsden funding. Our congratulations to Geoff Whittle, Hung Pham (who won a Fast Start grant) and to Rod Downey who has been awarded a one year extension to an existing grant. This brings the total number of current Marsden grants in the School to seven.

Further congratulations to Rod Downey for two further newsworthy events. Along with collaborators Denis Hirschfeldt (a regular visitor from Chicago), Andre Nies (Auckland) and Sebaastiaan Terwjn (Nijmegen), Rod has won the 2010 Schoenfield Prize (article section) for outstanding writing in the field of logic. The prize, of $1,000, is for their article "Calibrating Randomness" (BSL, September 2006) and will be awarded at the 2011 ASL North American Meeting in Berkeley in March. Secondly, one of the most eagerly anticipated books for some years has finally been published: Rodney G. Downey and Denis R. Hirschfeldt, "Algorithmic Randomness and Complexity" (Springer, November 2010). It is the first book in the new CiE book series "Theory and Applications of Computability". This mammoth work is a book destined to be a standard reference work in the field for many years.

Rob Goldblatt was an invited keynote speaker at a Conference on Mathematical Logic and Set Theory in Chennai, India, in August 2010. This was a satellite conference of the International Congress of Mathematicians at Hyderabad, which he also attended. On 13 September 2010, Rob introduced the biennial Forder Lecture, "Arithmetic progressions of primes" by Ben Green (University of Cambridge). This public lecture at VUW reported on the work of Prof. Green and his coauthor, the Fields medalist Terence Tao, who in 2004

proved that the sequence of prime numbers contains arbitrarily long arithmetic sequences.

Peter Donelan was interviewed on 'Saturday Morning with Kim Hill' on 23 October 2010 about the work of Benoit Mandelbrot who died earlier in the month. The podcast is available at `http://www.radionz.co.nz/national/programmes/saturday/20101023`.

To finish we have quite a lot of good news concerning our students. Adam Day, a PhD student supervised by Rod Downey, has been awarded a Miller Research Fellowship for a three year term, 2011–2014. Miller Research Fellowships are intended for brilliant young women and men of great promise who have recently been awarded, or who are about to be awarded, the doctoral degree. The Miller Institute for Basic Research in Science is located at the Berkeley campus of the University of California. All research is performed in the facilities provided by the host UC Berkeley academic department. The Institute will provide an annual stipend of US$60,000 and a research fund of US$12,000 per annum. This is a highly prestigious award, with very stiff competition, so congratulations are certainly due to Adam and to Rod.

Ben Clark was given the prize for the best student talk at the recent ACCMCC conference in Canberra. This is the Australasian Conference on Combinatorial Mathematics and Combinatorial Computing and is the most significant conference in discrete mathematics held in Australia/New Zealand. Further, at the New Zealand Association of Mathematics and Statistics Graduates conference, PhD student Tim McKenzie (supervised by Rob Goldblatt) won the prize for the people's choice, which was the favourite talk of the conference voted for by everyone that attended.

Bethan Cropp, one of Matt Visser's MSc students, won the Hartle Award for best student presentation at the international General Relativity conference in Mexico last July, competing against many PhD students. The talk she gave was based on the paper she and Matt wrote on "General polarization modes for the Rosen gravitational wave" which was recently published in the journal "Classical and Quantum Gravity". It's worth noting that two of Matt's PhD students, Silke Weinfurtner and Celine Cattoen, won the same award at the previous GR18 conference in Sydney. There is at most one award from each parallel session, and there are six awards overall, from a conference of some 600 attendees; so congratulations to Matt for building up an impressive track record of successful, award-winning students.

Congratulations also to Haizhen (Eric) Wu who successfully defended his PhD thesis in November on "Divisible statistics and their partial sum processes: asymptotic properties and applications". Eric's supervisor was Estate Khmaladze. Another of Estate's recent PhD completions, Giorgi Kvizhinadze, will start a two-year postdoc at the Wellington School of Medicine in January 2011. Sima Rouhollahi was awarded a VUW PhD scholarship and is now working on the topic of mathematical models for imperfect repairs of systems in two-dimensions (time and usage), under the supervision of Stefanka Chukova and Richard Arnold.

Sarah Marshall, who completed her MSc in 2007 in Operations Research and got full financial support from the University of Edinburgh for her PhD study, has been offered a 2-year fixed term teaching associate position at the University of Strathclyde in Glasgow.

SEMINARS

For abstracts for these seminars (including MSOR Colloquia), put an appropriately-old date in the School's seminar web page: http://msor.victoria.ac.nz/Events/Seminars.

Moshe Haviv (The Hebrew University of Jerusalem) "Auctions with a random number of bidders"

Sharleen Forbes (VUW and Statistics New Zealand) "New Ways of Viewing Official Statistics"

Peter Donelan (VUW) MSOR Colloquium, "A Robot's Walk in the Garden of Invariant Theory"

Ben Green (University of Cambridge) 2010 Forder Lecturer, "Approximate polynomials"

Rupert Holzl (University of Heidelberg) "Traceable sets"

Nokuthaba Sibanda (VUW) MSOR Colloquium, "How Good is Your GP?"

Deborah Chun (VUW) "Pairs of elements in unavoidable minors of 3-connected, binary matroids"

H. Garth Dales (University of Leeds) "Algebras of formal power series"

John Haywood

CONFERENCES

THE NEW ZEALAND MATHEMATICS COLLOQUIUM

Tuesday 7 - 9 December 2010, University of Otago, Dunedin

This year's New Zealand Mathematics Colloquium was hosted by the Department of Mathematics and Statistics, University of Otago. The 117 participants were treated to 5 plenary addresses, more than 80 excellent contributed talks and 10 posters covering a wide range of topics. The NZMS lecturer this year was Andre Nies of the University of Auckland speaking on "Interactions of computability and randomness", the ANZIAM lecturer was John Butcher also from Auckland with a presentation entitled "Taylor series — pure and simple: the order of numerical methods for ordinary differential equations" and the NZIAS lecturer was Jacqui Ramagge from the University of Wollongong talking on "Invariant differential operators on the sphere". The final two plenaries were from Hamish Spencer of Otago and Michael Eastwood from ANU.

This year there were 16 participants in the Aitken Prize competition for the best student presentation. The winner was Rachael Tappenden (University of Canterbury) and there were two highly commended talks by Emily Harvard (University of Auckland) and Luke Fullard (Massey University) who each received a Springer book voucher.

Left: Charles receiving his award from Graeme Weir. Right: Mihály being presented his award.

Prof.C̃harles Semple (University of Canterbury) was given this year's NZMS Research Award for landmark contributions to combinatorics, and in particular matroid theory, as well as leading work in phylogenetics and computational biology. The Early Career Award was given to Mihály Kovács (University of Otago) for his innovative research in the field of stochastic partial differential equations, particularly their numerical approximation. Finally Professor Geoff Whittle of Victoria University is the Aitken Lecturer for 2011 (although this wasn't mentioned at the time as our esteemed president was so taken back with his own award that he forgot to make the announcement!).

The social part of the events started with a most enjoyable Welcoming Reception on the Tuesday night at the end of the first day. In this relaxed environment the Poster Session was held. A considerable amount of time and effort had been put into preparation of the posters and they made an impressive display. This year ANZIAM provided an award for the best poster at the colloquium which was awarded to Kate Patterson (University of Auckland).

The support and facilities provided by the University of Otago were greatly appreciated and not even the Otago weather could dampen the magnificent view from Mount Cargill. A wonderful dinner at Larnach Castle was another highlight of the Colloquium.

Agate Ponder-Sutton


Left: Kate with her ANZIAM poster award. Right: Aitken prizewinners, Luke, Rachael and Emily.

NZMS TRAVEL SUPPORT REPORTS

CONFERENCE IN NUMERICAL ANALYSIS 2010

Recipient: Annie Gorgey

I am very grateful to the New Zealand Mathematical Society and The University of Auckland Graduate Research Fund for their financial support. It has enabled my participation at the international conferences in Greece in September, 2010.

It was a good opportunity for me to attend the conference in Chania, Greece entitled "Conference in Numerical Analysis (NumAn 2010) — Recent Approaches to Numerical Analysis: Theory, Methods and Applications". I presented a talk, "Extrapolation of symmetrized RungeKutta methods" and received valuable comments which are helpful to my research.

This was my first experience in participating at an international conference and I am really thankful for the opportunity to discuss my work with Professor Robert Beauwens and Professor Claude Brezinski who are editors of important international journals. Moreover, I have also submitted a paper to the Applied Numerical Mathematics Special Issue of joint work with my supervisor Dr Robert Chan. I am indeed thankful to my supervisor Dr Robert Chan for encouraging me to participate in this conference.

I would like to thank the New Zealand Mathematical Society for the student travel grant which has supported my participation.

MATHEMATICAL NEUROENDOCRINOLOGY WORKSHOP

Recipient: Wen Duan (University of Auckland)

This is the last year of my PhD. My major work is to study GnRH neurons in the mouse brain and build up a model for these neurons.

GnRH neurons are hypothalamic neurons that secrete gonadotropin-releasing hormone (GnRH), which is one of the crucial hormones for sexual development, fertility and maturation. Our focus is trying to understand the mechanisms underlying the production and synchronization of calcium oscillations in GnRH neurons, how such oscillations are related to the membrane potential, and how they control secretion of GnRH. Our model of electrical bursting and calcium transients in a GnRH neuron has been highly successful so far, with one paper already published in the Journal of Neuroscience, and a second accepted by the Journal of Theoretical Biology. Predictions from the model have been tested and confirmed experimentally, and so the model has already contributed substantially to our understanding of GnRH neurons.

In August this year, I had a chance to attend the Mathematical Neuroendocrinology workshop, which is organised in the Mathematical Biosciences Institute (MBI) in the Ohio State University. Generally

speaking, this workshop was definitely the ideal place for me to present and discuss my work with a lot of world experts in the same area, not just modellers but also experimentalists.

A lot of neuron physiology seminars were given in the morning sessions and a lot of free discussions were held in the afternoon sessions. Actually, thinking about it, this was the first time that I came across listening to the talk in the morning and discussing your problem with the other people in the afternoon. I think this is a good format for a workshop. You do not just listen to their new results but also you can have a real chance to discuss anything that you do not understand.

Just like what I planned before attending the workshop, I spent a lot of time talking to those experts about my model and asking physiology questions. These people included Richard Bertram, Arthur Sherman, Yuexian Li, Stanko Stojilkovic and Sue Moenter. It was truly my honour that they could sit down and really look at my work step by step. I have to thank my supervisor here, because he actually sent out an email beforehand to these people and asked them to take care of me, which made everything so easy. Of course, I did not understand everything that these people said, but this just gave me extra motivation to study harder. After discussions, I got some better ideas to improve my model. These ideas were really good ideas that I can put into my model, improving the simulation results.

To sum up, I am very glad that I went to this MBI workshop. I met a lot of people there and I had a lot of time talking to them. I also made some contacts after I came back to New Zealand. This trip has been one of my best workshop experiences. I also appreciate the NZMS financial assistance, the grant money surely helped me a lot.

SYMMETRY, SEPARATION, SUPER-INTEGRABILITY AND SPECIAL FUNCTIONS (S^4) CONFERENCE

Recipient: Howard Cohl (University of Auckland)

Howard Cohl attended the S^4 conference in Minneapolis, Minnesota and would like to sincerely thank the NZMS for financially supporting his attendance for this conference. The conference was held at the School of Mathematics, University of Minnesota, Minneapolis, U.S.A, from September 17–19, 2010.

The S^4 conference was in honour of Willard Miller, Jr., who recently retired from the School of Mathematics at the University of Minnesota and celebrated Miller's career and his many wide-ranging research contributions in symmetry, separation of variables, super-integrability, and special functions. On these topics, Miller is a world leader, and has co-authored over 190 papers and three important books. The 18 invited speakers who presented at this conference gave talks on areas related to Miller's past and ongoing mathematics research. One powerful attribute of this conference was the detailed description by many authors of today's current state of research in super-integrable systems. This subject of active research promises to lead to many results of particular deep insight. Of particular interest and discussion at this conference was the important research contributions of Pavel Winternitz, Département de mathématiques et de statistique at the Université de Montréal and Miller's principal collaborator Ernie Kalnins (recipient of the NZMS Research Award), Department of Mathematics at the University of Waikato. During the conference, Howard presented a poster paper entitled, "Fourier and Gegenbauer expansions for fundamental solutions of the Laplacian and powers in $\mathbf{R}^d$ and $\mathbf{H}^d$," which listed several closed-form expressions from Howard's Ph.D. research in the Department of Mathematics at the University of Auckland. While attending this conference, Howard was able to make strong connections with experts in his field and initiated several research collaborations.

NEW ZEALAND MATHEMATICS AND STATISTICS POSTGRADUATE CONFERENCE

The award-winning Ricky who holds the title of "best bus driver in New Zealand" transported the postgraduate students on a five hour coast-to-coast adventure, from Christchurch to Westport, to the New Zealand Mathematics and Statistics Postgraduate (NZMASP) conference. This year it was held at the University of Canterbury field station in Westport from 22–25 November 2010. There were 34 participants (enrolled for masters and doctoral degrees) from all over New Zealand. There was also a good spread of subjects with approximately one third from each of applied mathematics, pure mathematics and statistics.

The student-run and organised conference was a great success. All participants enjoyed the relaxed atmosphere and supportive environment in which to network among fellow postgraduates, gain new and up-to-date knowledge about cutting edge research by their peers, and present their own research in a well thought-out, high quality presentation.

At this year's conference we were privileged to hear plenary presentations from Gaven Martin (Massey University at Albany) whose talk was entitled "Quasiregular mappings, curvature and dynamics", Esther Meenken (Plant and Food Research) who spoke about the transition from academia to industry and David Wall (University of Canterbury) who talked about Harry Potter and his invisibility cloak!

Each participant gave a presentation on their research at the conference. We had two parallel sessions at the conference and held a poster session on the Tuesday evening. Like previous years, all the presentations were of an extremely high quality, covered a diverse range of subject matter and were thoroughly enjoyable. Awards were given for the best presentation in each discipline. This year's awards went to Emily Harvey (University of Auckland), Edoardo Perischitti (University of Auckland), and Anna MacDonald (University of Canterbury) with the people's choice award going to Timothy McKenzie (Victoria University of Wellington).

The conference organisers would like to thank the sponsors of this event for encouraging and enabling the professional development of postgraduate students throughout New Zealand. The sponsors this year were:

- New Zealand Mathematical Society (NZMS)
- New Zealand Statistical Society (NZSA)
- Australia New Zealand Industrial and Applied Mathematics (ANZIAM)
- New Zealand Institute for Advanced Study (NZIAS)
- New Zealand Institute of Mathematics and its Applications (NZIMA)
- Hoare Research Software Ltd (HRS)
- Statistical Analysis Software (SAS)

For the first time, we held a session discussing the future and benefits of the NZMASP conference. It was a great opportunity for delegates to reflect and give feedback on previous conferences and where the future of this event lies. Some of the main ideas which came from this discussion included the following.

- Often mathematics and statistics are treated very separately and this is one of the few conferences which unifies the deeply related subjects.
- It is an opportunity for postgraduates to go through the process of preparing and presenting a talk which builds skills essential for other conferences including the NZMS and NZSA conferences.
- The conference builds a postgraduate "community" so that students from different universities can come together and share mathematical experiences and ideas about the research process.

As well as these points, it provides participants with a supportive environment and also gave students responsibilities, such as being a session chair, which they otherwise would not have the opportunity to do until they become an academic.

We would like to thank the organising committee for all their support during the organisation process. They included: Peter Green (University of Otago), Michael Snook (Victoria University of Wellington), Katie Sharp (University of Auckland), Haydn Cooper (Massey University of Albany). A special thanks also to last year's organisers, Luke Fullard and Atheer Matroud (Massey University of Palmerston North) for their guidance. Being such a great opportunity for postgraduates we look forward to seeing the conference continue for many years to come.

Shannon Ezzat
Anna MacDonald
Rachael Tappenden

NOTICES

Minutes for the 36th Annual General Meeting of the NZMS
(incorporating the 2010 NZMS Colloquium business meeting)
4.30 pm, Tuesday 7 December 2010
University of Otago

Present: Charles Semple (chair), Alex James (minutes), Peter Donelan, Peter Fenton, John Hannah, John Curran, Alona Ben-Tal, Boris Baeumer, Carlo Laing, Winston Sweatman, Luke Fullard, Robert McKibbin, Graham Weir, Maarten McKubre-Jordens, Emily Harvey, Rachael Tappenden, Shannon Ezzat, Atheer Matroud, Chris Tuffley, Agate Ponder-Sutton, John Butcher, Kevin Broughan, Jeff Hunter, Iain Raeburn, Astrid an Huef, Ben Whale, Afshin Mardani, Tuan-Yow Chien, Manfred Sauter, Robert Thompson, Marston Conder, David Gauld, Claire Postlethwaite, Bill Barton, Rod Gover, Steven Galbraith, Tom ter Elst, Rua Murray, Stephen Joe, Tatiana Evans, Graeme Wake, Shaun Hendy, Jorg Frauendiener, Ernie Kalnins.

1. **Apologies**

   Apologies were received from Robert Mclachlan, John Shanks

2. **Minutes of 35th Annual General Meeting (including minutes of the 2009 Colloquium business meeting).** Correction: item 2 should read "minutes of 34th meeting". Proposed Charles Semple, passed unanimously.

3. **Matters arising from the minutes**

   LMS (Aitken) lecturer will be a reciprocal arrangement, on alternate years a New Zealander visits Britain and a British mathematician visits NZ. Next candidate to be announced at the dinner. A similar arrangement has been made with the AMS for six years possibly to be called the Maclaurin lecturer. The AMS and LMS lecturers will visit New Zealand on alternative years.

4. **President's report**

   The president presented his report (see the President's Column on page 3). Inaugral awarding of the Jones medal to John Butcher for lifetime achievement in the mathematical sciences. Spending has increased dramatically recently and we are trying to fill the gaps left by the possible ceasing of NZIMA CoRE funding by assisting more workshops and student grants. This year's Forder lecturer was Ben Green and Rachel Tappenden was given the Gloria Olive travel award. The 2009 Aitken prize went jointly to Shannon Ezzat and Mike Smith, the research award went to Andre Nies and the early career award went to Stephen Marsland. Thanks to John Shanks for updating the webpage, to Stephen Joe for being our previous webmaster and Boris for becoming our new webmaster, and to Robert Mclachlan for his help.

5. **Treasurer's report**

   The treasurer presented his report. Subscriptions are up but interest rates have gone down from 7% to 5% and most of our investments reach maturity this year. The AMS (Maclaurin) lecturer is anticipated to cost $6,000 every other year and the Forder lecturer will cost a similar amount in the alternate years. Our current subscription rate is far below that of similar societies. The council has approved the treasurer to propose raising the subscription for ordinary members to $80 (incl GST) and other subscriptions as outlined in the report (Motion Peter Donelan, seconder Graham Weir, carried). The meeting approved the accounts (motion Charles Semple, passed).

6. **Appointment of auditors** The accountants and auditor were reappointed (motion Peter Donelan, seconder Boris Baeumer, passed).

7. **Membership Secretary's report and annual subscriptions** The president presented the report for the membership secretary.

8. **Election of Councillors**

   - **Departing Councillors** Robert Mclachlan, Winston Sweatman and Peter Donelan.

- **Nominated** Robert McKibbin (Proposer Winston Sweatman, Seconder Mick Roberts)
- **Nominated** Peter Donelan (Proposer Charles Semple, Seconder Boris Bauemer).

Both these nominations were accepted. Peter Donelan is happy to continue being treasurer. There were no nominations for incoming vice president so the position has been deferred initially to the colloquium dinner. A big thank-you to Winston for all his hard work as secretary.

9. **Report of the 2009 Colloquium** Correction: Item 2: should be minutes of the 2008 meeting. The minutes were accepted unanimously. Winston presented the colloquium report. There were no matters arising and the meeting accepted the report (attached).

10. **Report of the 2010 Colloquium** The report was presented by Peter Fenton (see attached). Thanks go to the organising committee for all their hard work. The report was accepted unanimously.

11. **Forthcoming Colloquia**

    - The 2011 colloquium will be in Auckland held jointly by UoA and AUT, Dec 6–8th. Stephen Galbraith will be chair of the organising committee.
    - Future venues are Victoria 2012 and possibly Canterbury 2013

12. **New Zealand Journal of Mathematics** The society continues to support the journal.

13. **General business** The council is also looking at further ways to improve the society's financial situation to help fund further initiatives in particular student travel grants, workshops and maths olympiad, maths education. Suggestions included encouraging members to include the society as a will bequest or give additional voluntary donations, asking general trusts for endowment funds. Council members will be happy to discuss this matter with members outside the meeting.

    The meeting closed at 5.25pm. Next meeting in Auckland 6th December 2011.

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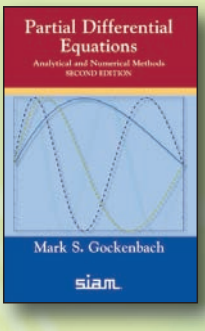

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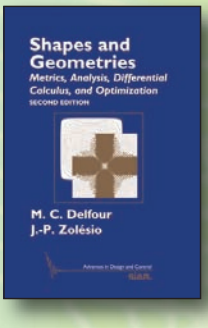
Advances in Design and Control 22



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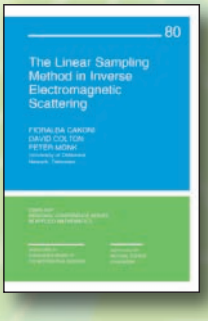
NEW

Fioralba Cakoni, David Colton, and Peter Monk

CBMS-NSF Regional Conference Series in Applied Mathematics 80



The linear sampling method is the oldest and most developed of the qualitative methods in inverse scattering theory. It is based on solving a linear integral equation and then using the equation's solution as an indicator function for the determination of the support of the scattering object. This book describes the linear sampling method for a variety of electromagnetic scattering problems.

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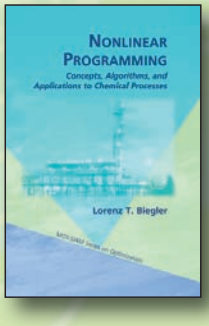
Lorenz T. Biegler

MOS-SIAM Series on Optimization 10



This book addresses modern nonlinear programming (NLP) concepts and algorithms, especially as they apply to challenging applications in chemical process engineering. The author provides a firm grounding in fundamental NLP properties and algorithms, and relates them to real-world problem classes in process optimization, thus making the material understandable and useful to chemical engineers and experts in mathematical optimization.

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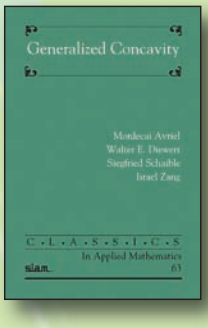
Generalized Concavity

Mordecai Avriel, Walter E. Diewert, Siegfried Schaible, and Israel Zang

Classics in Applied Mathematics 63



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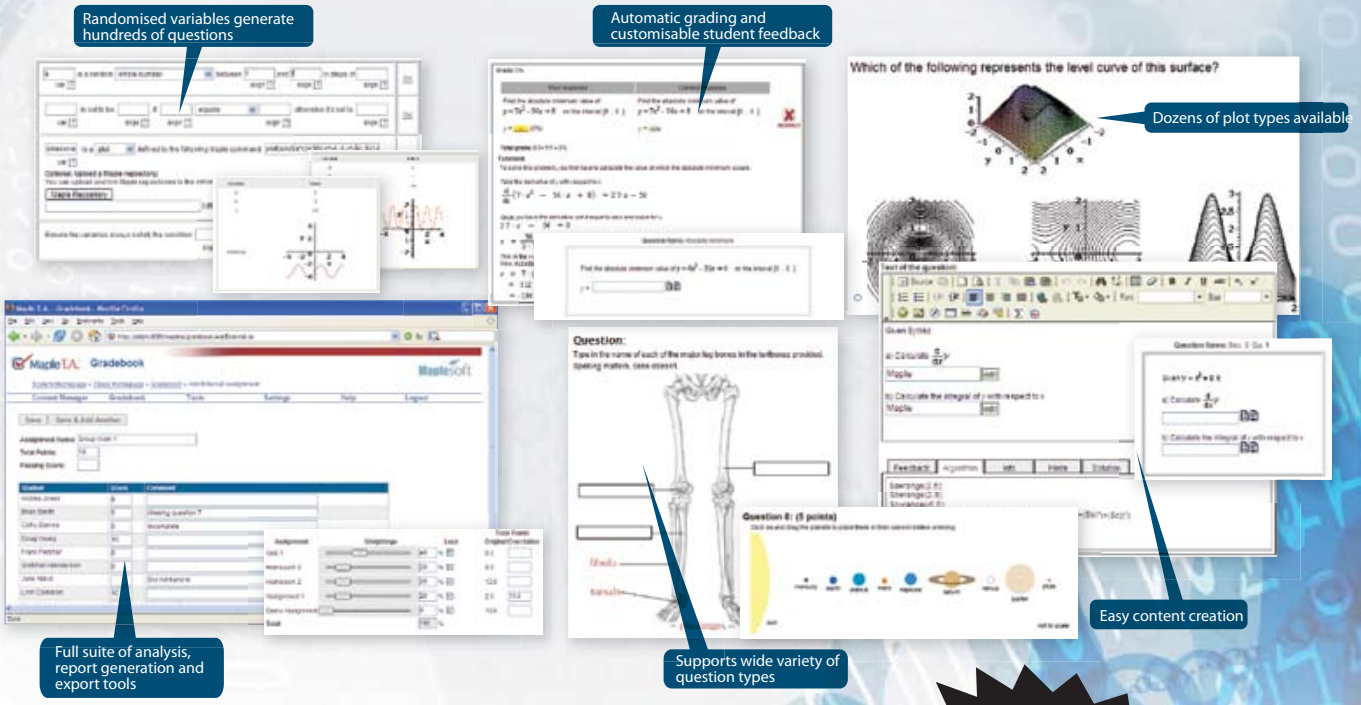

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