Number 101 December 2007

# NEWSLETTER

OF THE

N E W Z E A L A N D M A T H E M A T I C A L S O C I E T Y

*Contents*

# PUBLISHER'S NOTICE

This newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was edited by Mark McGuinness, assembled by Rowan M$^{c}$Caffery and printed at Victoria University of Wellington. The official address of the Society is:

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### Web Sites

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http://www.math.waikato.ac.nz/NZMS/NZMS.html (Webmaster: stephenj@math.waikato.ac.nz)
The newsletter is available at: http://IFS.massey.ac.nz/mathnews/NZMSnews.shtml
Editorial enquiries and items for submission to this journal should be submitted as text or LaTeX files to mark.mcguinness@vuw.ac.nz.

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# EDITORIAL

This issue of the Newsletter of the New Zealand Mathematical Society is dominated by an obituary and Centrefold on Robin Wooding, and this seems to me to be very appropriate. I met Robin in 1983 when I joined the Applied Mathematics Division of the DSIR, and the comments in the obituary about how gentlemanly he was, really ring true. He was always very unassuming, and his ability and track record speak out much louder than he ever did. I was particularly struck by the large number of his publications that have been cited over one hundred times. Read on for details.

In this issue you will see that besides signs that we are getting older, there are also signs that mathematics in New Zealand is self-renewing. Look for the new young appointments, the travel and collaborations, the Marsden Grants gained, the Fulbright Award to Graeme Wake, the James Cook Award to Rod Downey, the Research Award to Ernie Kalnins, and the Early Career Awards to Noam Greenberg and Catherine McCartin.

Well, I have just come back from a lunch centred around fresh-water snails, smaller than the fingernail of your smallest finger, coloured a blue-green that is almost bright, but delicately flavoured, served in a bubbling bowl of hearty soup and accompanied by rice, kimchi and chili peppers. Now as the sun settles lower in the sky of the Land of the Morning Calm, it is time to attend to referees' comments and a *To Do* list that seems to grow faster than it can be attended to. I hope that you, Gentle Reader, can find the time in your busy schedule to read through the rest of this 101st edition of our Newsletter!

*Mark McGuinness*
*Editor*

# LOCAL NEWS

## AGRESEARCH

Tanya Soboleva was an invited speaker at the AusBiotech BioInformatics Australia conference held in Brisbane from 23-24 October 2007. She gave a presentation on the kinetics of gene regulatory networks during the early stage of embryogenesis. In addition Tanya visited the Institute of Molecular Biosciences (IMB) at the University of Queensland and CSIRO. Tanya also gave a seminar at the Bio-Engineering Institute at the University of Auckland on reproductive hormone interactions and postpartum anoestrus in dairy cows on the 25th of September 2007. Although it was graduation day there were plenty of students in attendance.

Tony Pleasants and Tanya Soboleva hosted Niels Madsen from the Danish Meat Research Institute to discuss the potential application of our mathematical modelling work on microbial growth and food safety/quality to the Danish pork and beef industry. Paul Shorten visited CSIRO in Brisbane on the 22-23rd of November 2007 and gave a talk on mathematical models of the response of skeletal muscle to electrical stimulation and insulin transport in muscle.

We farewell statistician David Baird from the AgResearch Lincoln campus. David started with AgResearch in 1984 and has made an exceptional contribution to science. We wish David the very best for his future endeavours.

*Paul Shorten*

## THE UNIVERSITY OF AUCKLAND

### DEPARTMENT OF COMPUTER SCIENCE

The RSNZ has awarded Dr Alexei Drummond the Hamilton Memorial Prize for his significant contribution to computational modelling, with implications for population genetics, phylogeography and phylogenetics.

Brian Carpenter joined us in September from IBM on a rolling contract, to work in the data communications area. He is heavily involved with the development of IPv6. Brian arrived just in time to lecture the second half of COMPSCI 314 and COMPSCI 742!

Preparations for the new Science IT setup are still progressing. However, the final form of this function is not completely clear at this time. One change that has occurred from Science IT to date is a much clearer differentiation between research and teaching support roles, and those which provide for the Science IT function.

Cris Calude has won a Dean's Teaching Excellence Award.

John Grundy and John Hosking gained further FoRST funding of $3,400,000 over 3 years, for software process and product improvement.

Eleven people applied for Science Faculty Research Funds, and six succeeded:
Alexei Drummond got $135,000 for a Postdoctoral Fellow to work on New computational techniques for Bayesian evolutionary analysis.
Reinhard Klette got $25,000 for Understanding of events in dynamic environment using computer vision.
Emilia Mendes got $5,405 for Investigating the effects of personality on team productivity and climate.
Patrice Delmas got $30,000 for A multi-layered 3D face model using CAT/MRI/Stereo vision acquisition systems.
Beryl Plimmer got $22,700 for A collaborative digital environment for sketching data models.
And Mark Wilson got $10,000 for Automated asymptotics of multivariate generating functions.

Reinhard Klette (with Bodo Rosenhain & Dimitris Metaxas) has edited the book "Human Motion: Understanding, Modelling, Capture, and Animation", which was published in October 2007 by Springer, as Volume 36 in their series on "Computational Imaging and Vision".

John Rugis (PhD student) got a poster into the top 10 at SIGGRAPH.

#### Seminars

**Shaoying Liu** , "Formal engineering methods for software development".

**Prof. Alistair Moffat** (University of Melbourne), "Rank-based precision for measurement of retrieval effectiveness".

**Dr Helen Purchase** (University of Glasgow), "Graph-drawing algorithms: how good are they really?".

**Noryathi Mohd Ali** , "A generic visual critic authoring tool".

**A-Prof. Paul Bonnington** (Department of Mathematics), "Engaging with computational resources on the Australasian GRID/BESTGRID".

**Prof. Uwe Wloka** (University of Applied Sciences, Dresden), "Investigations to the conformance about Oracle, DB2, MS-SQL Server and Sybase with respect to SQL:2003 Standard".

*Garry J. Tee*

## DEPARTMENT OF MATHEMAICS

Hannah Bartholomew and Vic now have a daughter Zoe (2.99kg).

Bill Barton's book "Language & Mathematics: Telling Mathematical Tales" was published by Springer, in November. The book takes a new approach to looking at how different languages express mathematical ideas (such as number, position and pattern). It illustrates the possibility of different mathematical worlds, challenging the notion that mathematics is an expression of universal human thought. It also explores the implications for the ways in which we learn and teach mathematics.

Paul Bonnington has accepted an offer from Monash University, to become Professor and Head of their eResearch Centre. Paul, Karyn and Craig will move to Melbourne in January, and so we will organize an appropriate function towards the end of this year.

Boris Pavlov is retiring at the end of the year, and a ceremony for him will be held on December 17.

Ivan and Barbara Reilly are retiring. In February 2008, the Devonport Topology Festival will be dedicated to Ivan.

Arkadii Slinko has won a Dean's Teaching Excellence Award. The citation for this well-deserved award talks specifically about his "rare talent" with advancing students, mentioning his publications with undergraduate researchers and his work on the Olympiad programme. It also mentions what we all know, Arkadii's insightful contributions to our course development cycles. Also, Arkadii received a grant from the UoA Staff Research Fund, followed by a grant from the Faculty Research Development Fund.

Tom ter Elst received a grant from the Faculty Research Development Fund.

Mike Thomas was successful in the TLRI funding round with a grant of $180,000 for a 2-year research project, and also he received a grant from the UoA Staff Research Fund.

Shayne Waldron received a grant from the UoA Staff Research Fund.

John Hollis Holt is now an Honorary Research Fellow, working on hyperbolic 3-manifolds.

Dr V. Alexandre Marenko is now an Honorary Academic Associate, working on Formalization of knowledge.

The biennial conference of the NZ Association of Mathematics was held in September at St Cuthbert's College, attended by over 500 teachers. Maxine Pfannkuch gave an invited plenary address, which was very well-received. The Mathematics Education Unit sponsored Helen Doerr (Syracuse University). Talks were given by Hugh Gribben, Barbara Kensington-Miller, Barbara Miller-Reilly, Judy Paterson (5 presentations!), Ivan Reilly, James Sneyd and Mike Thomas. Many of our PhDs, Masters teacher-students and teacher-researchers also presented papers.

Prof. Ian Stewart (University of Warwick) was here in September and October, as the first Seelye Fellow. In addition to giving departmental seminars, he gave a public lecture here on "All the World's a Network". At Auckland Museum he gave a public lecture on "Mathematics of Evolution" as part of the Darwin Festival, and he gave the 2007 Archey Lecture (for secondary students) on "Animal Gaits".

Recent visitors include Prof. Len Bos (University of Calgary), Prof. Helen Doerr (Syracuse University), Dr Charles Eaton (University of Manchester), Prof. Chris Godsil (University of Waterloo), Dr Frank Himstedt (Munich University of Technology), Prof. Jari Kaipio (University of Kuopio), Prof. Dimitri Leemans (Universit Libre de Bruxelles), Dr Felipe Leitner (University of Stuttgart), Prof. Tomaz Pisanski (University of Ljubljana), Prof. Mamokgethi Setati (University of Witwatersrand), and Dr Roman Smirnov (Dalhousie University, Halifax).

Daniel Watzenig visited our Department for several months in 2005, working on his PhD from the Technical University of Graz, supervised by Colin Fox. The work that he did here formed the brunt of his thesis, which was presented and passed in 2006. In September 2007 Daniel was awarded the Measurement Award of 2007 (among students in Germany, Austria and Switzerland), based on his PhD thesis and a publication from the thesis.

Alison Kohout received a grant from the UoA Graduate Research Fund.

### Seminars

**Dr Shixiao Wang** , "On the stability of swirling flows in a finite pipe".

**Dr Roman Smirnov** (Dalhousie University, Halifax), "Hamilton-Jacobi theory via Cartan geometry" (2 lectures).

**Dr Julia Novak** , "Measures and bounds for key distribution patterns".

**Dr Shayne Waldron** , "Tight frames and their symmetries".

**Dr Bart Oldeman** , "A kinetic model for a molecular motor with periodic forcing".

**Dr Frank Himstedt** (Munich University of Technology), "Character tables of parabolic subgroups" (2 lectures).

**Prof. Rod Downey** (VUW), "Computability, history and logic".

**Hugh Gribben** , "Trisections and cube roots - exploring the constructible in origami".

**Callum Sleigh** , "Overdetermined differential equations and applications".

**Prof. Ian Stewart** (University of Warwick), "Synchronized chaos in dynamic networks".

**Prof. Jari Kaipio** (Kuopio University), "Optimization and optimal control in high intensity ultrasound surgery".

**Prof. Mike Hendy** (Massey University - Palmerston North). "Penguin mitochondria and the harmonic series".

**Dr Tom ter Elst** , "Does diffusion determine the body?".

**A-Prof. Bill Barton** , "The Language of Mathematics": Telling Mathematical Tales".

**Prof. Dimitri Leemans** (Universite' Libre de Bruxelles), "On computing subgroup lattices of sporadic groups with MAGMA".

**Prof. Mike Eastwood** (University of Adelaide), "Div, grad, curl and all that".

**Dr Mike Meylan** , "Time-dependent water-wave scattering by bottom-mounted cylinders" (2 lectures), and "Generalized eigenfunction expansion for the 2nd wave equation (and maybe water waves)".

**Prof. Derek W. Robinson** (ANU), "Degenerate elliptic operators: separation properties".

**Peter Hughes & Murray Britt** (Faculty of Education), "The New Zealand numeracy strategy framework and a pathway for algebraic thinking".

**Prof. Mamokgethi Setati** (University of Witwatersrand), "Exploring pedagogy for teaching mathematics in multilingual classrooms".

**Dr Felipe Leitner** (University of Stuttgart), "Unitary conformal holonomy".

**Prof. Len Bos** (University of Calgary), "Some notions of optimal interpolation points".

*Garry J. Tee*

## DEPARTMENT OF STATISICS

Chris Wild has been elected a Fellow of the Royal Society of New Zealand.

Mark Holmes is an Auckland graduate who is completing his postdoc in probability theory at EURANDOM; and now he has been appointed as Lecturer here.

In the Marsden Fund grants, both Yong Wang and Sharon Browning have been awarded Fast-start grants. The front page of the latest issue of Marsden Update features Marti Anderson's award of $805,000 over 3 years. And Marti has recently settled a new contract with the USA agency NOAA (National Oceanic & Atmospheric Administration), on analysis of habitat restoration projects.

Patricia Metcalf is involved in a $150,000 grant from the HRC for studies relating asthma and diet, and Alan Lee has gained a $70,000 OSResearch grant from Statistics New Zealand.

Paul Murrell ran two R courses using an online discussion board: "Introduction to R" and "Graphics in R", each four weeks long. Stephanie Budgett has been invited to give a summer course on "An Introduction to Statistics" by the New Zealand Social Science Network, and Andrew Balemi drew 35 attendees at an in-house Statistics New Zealand course with the title: "How I Stopped Worrying and Fell in Love with the Survey Cycle". Andrew's winning aphrodisiac has not yet been revealed.

Christian Roever, who has recently completed his PhD on Bayesian astrophysics with Renate Meyer, won a major student prize at the Joint Statistical Meetings in Salt Lake City, in the Bayesian Statistical Science section.

We welcome four new PhD students: Assad Ali (working with Renate Meyer), Bobby Wilcox (working with Alan Lee), Sohail Chand (working with Patricia Metcalf), and Irene Zeng (working with Sharon Browning).

Finally, the Impact Factor of the Australian and New Zealand Journal of Statistics rose from 0.387 to 0.537 from 2004 to 2005, as a result of one paper

by Marti Anderson. The publishers flagged this as a significant achievement for the journal, quoting in their recent report that, "The reason for this success ... is the Anderson article from 2003 which has received 29 citations."

**Seminars**

**Prof. Ruth J. Williams** (UCSD), "Stochastic networks with resource sharing".

**Prof. David Firth** (University of Warwick), "Quasi variances".

**Dr Alan Wan** (City University of Hong Kong), "On a bull/bear contract call signal-based trading strategy".

**Dr Stephanie Guindon** , "Modelling the heterogeneity of molecular evolution processes".

**Dr Mark Holmes** , "A survey of some self-interacting random walks".

**Dr Russell Millar** , "Assessment of hierarchical models for count data".

**Dr Ilyas Siddique** (University of Queensland, and Instituto de Pesquisa Ambientai da Amazonia), "Application of mixed models and multivariate hypothesis testing to long-term tropical tree assemblage data from a BACI experiment".

**Dr Ivan Kojadinovic** , "Hierarchical clustering of continuous variables, based on the empirical copula process".

**Dr Rolf Turner** (Faculty of Education), "Direct maximization of the likelihood of a hidden Markov model".

**Dr S. Ejaz Ahmed** (University of Windsor), "Shrinkage and variable selection in partially linear models".

**Prof. Marie-Josee Fortin** (University of Toronto), "Spatial graph theory: from boundary detection to landscape connectivity".

*Garry J. Tee*

## UNIVERSITY OF CANTERBURY

### DEPARTMENT OF MATHEMATICS AND STATISTICS

We welcome Rua Murray, who has joined us from Waikato. On a sadder note, we say goodbye to Grace Johnson, who has worked in the department for many years. Grace began her university studies in her fifties, completed her PhD in statistics in her seventies, and is now retiring from tutoring in her eighties, to move on to bigger and better things. We wish her well. Neil Watson will retire in February 2008, but he will be with us for another three years on a half-time teaching contract. Neil says he is looking forward to having time to concentrate on his hobbies — including mathematics!

Mike Steel and Charles Semple gave talks at a workshop on Current Challenges and Problems in Phylogenetics, as did PhD students Klaas Hartmann and Peter Humphries. The workshop forms part of a four-month programme on phylogenetics at the Isaac Newton Institute for Mathematical Sciences in Cambridge. Marco Reale gave a talk at the workshop on Non-linear and Complex Systems Analysis in Brisbane in September. Neil Watson also crossed the Tasman in September, to talk at the Australian Mathematical Society meeting in Melbourne. David Wall spoke at the workshop on Recent Advances in Functional and Delay Differential Equations at Dalhousie in November.

Ronald Begg, who was recently awarded his PhD, has been placed on the Dean's List for Excellence. Jason Bentley received a student prize for his talk at the 2007 NZ Statistical Association Conference in July. Michael Langton and Hannes Diener won prizes for their talks at the NZ Mathematics and Statistics Postgraduate Conference in November (see separate report elsewhere in this issue); Scott Graybill organised the conference. Undergraduate student Piers Lawrence has been awarded a Summer Scholarship at ANU.

Recent visitors include: Dr Alec Stephenson (National University of Singapore), Dr Thomas Forster (Cambridge), Dr Martin O'Hely (Queensland), Simone Linz (Düsseldorf), Dr Roger Littlejohn (AgResearch), Dr Timothy Robinson (Wyoming), Dr Oleg Davydov (Strathclyde), Prof Niklas Wellander (Swedish Defence Research Agency)

**Seminars**

**Dr Alec Stephenson** (National University of Singapore) "Exploiting occurrence times in likelihood inference for componentwise maxima"

**Dr Thomas Forster** (University of Cambridge), "Implementations"

**Prof Douglas Bridges** (University of Canterbury), "Constructive reverse mathematics"

**Dr Martin O'Hely** (University of Queensland) "Modelling fates of duplicate genes"

**Dr Roger Littlejohn** (AgResearch), "A semi-Markov model for biting time series"

**Prof Willy Hereman** (Colorado School of Mines), "Symbolic computation of conservation laws of nonlinear PDEs in N+1 Dimensions"

*Ben Martin*

## MASSEY UNIVERSITY

### INSTITUTE OF FUNDAMENTAL SCIENCES (PALMERSTON NORTH)

The semester S12 and S2 exams are over but no real break from teaching for most of us. S3 started shortly after S2 officially came to an end and the only discontinuity was the weekend in between. It can be frustrating when S3 assignments are being submitted when we are still marking exams. Three 100 level courses are offered extramurally in S3. There is a 2.5 day contact course in early January for these courses. Most contact with the students is via the S3 email address where they send questions in about assignments. Personal questions are dealt with by the appropriate course coordinator.

Our Summer Scholarship students this year are Fleur McDonald and Luke Fullard. Fleur is working with Robert McLachlan and Luke with Tammy Smith and Bruce van Brunt.

Luke Fullard and Dion O'Neale attended the Maths and Stats Postgraduates' conference held in Queenstown from the 21st of November till the 23rd. Luke spoke about his honours project work with Tammy Smith on modelling hydrothermal eruptions, and Dion discussed his Ph.D. work on geometric integration under Robert McLachlan. Chris Tuffley, who went with them and helped judge the NZIMA Best Presentation Award, said that the standard at the conference was very high, and that the panel had a difficult time choosing a winner. All three said the conference was well worth it, and hoped that it would become an annual event.

Congratulations to Charles Little who has been promoted to Professor. Charles is currently in Singapore to do some research with Dr Fengming Dong but will be back on time to attend the Colloquium.

Bruce van Brunt has come back safe and well from the Land of the Calm. Like the previous two years, Bruce spent two months at KAIST in South Korea. He came as part of an applied mathematics visiting professor team and lectured on the calculus of variations among other topics.

*1997... The year when we lost our "Faculties" and became "Institutionalized"...*

It is now about 10 years ago when the major perestroika took place. Faculties at Massey were abolished and Colleges were created. Prior to that event Mathematics and Statistics belonged to the Faculty of Information and Mathematical Sciences (FIMS) FIMS also included Computer Science and Information Systems. This structure was not allowed to stay and as a consequence FIMS got hanged, drawn and quartered. Not quite quartered since Computer Science and Statistics were grouped together with Electronic and Infocomm Engineering (EIE) to form the Institute of Information Sciences and Technology (IIST). Information Systems chose to go to the College of Business. Mathematics was grouped together with Chemistry and Physics to form the Institute of Fundamental Sciences (IFS). Mathematics did not join IFS physically until April 1999. By that time office space had been created in Science Tower B to house the mathematicians.

But now after a decade a mini perestroika is taking place. The School of Engineering and Advanced Technology is being established and will consist of the School of Engineering and Technology (SET), Institute of Technology and Engineering ITE and most of IIST (including all computer science staff, but excluding statistics staff members). It was decided that as from the 1st of January 2008, Statistics unanimously agreed to join IFS as the fourth discipline. Thus after a decade of separation of Mathematics and Statistics, the walls are tumbling down and we will be in the same Institute. The physical aspect may be difficult to achieve in a short time. Fortunately we do not live far away from each other.

On a sadder note, the Department of Information Systems has ceased to exist. This took place about half a year ago. As usual this resulted in quite a few redundancies. Staff that survived the shake-up went into the new established Information Science Research Centre.

Christine Burr reports the following about the annual Mathematics and Statistics Teachers' Evening:

Another very successful evening for mathematics and statistics teachers and university mathematics and statistics staff was held this year on Thursday 18 October 2007. Once again, it was great to see so many teachers at this evening.

After meeting for tea and coffee, the evening began with an introduction by Sandy Shillington on behalf of the Deputy Vice-Chancellor, Professor Ian Warrington. This was followed by a talk given by

Dr Geoff Jones Senior Lecturer, Statistics, on "The Role of The Statistician". His very interesting talk successfully illustrated the meaning of the quotation "The great thing about being a statistician is that you get to play in everyone's garden." He used examples of projects in which he has been involved in, ranging from work with antigens to kiwis versus stoats to poverty maps and the survival of cancer patients, just to name a few.

Dr Peter Rawlins Lecturer, School of Curriculum and Pedagogy was the next speaker. His talk on "Students' Perception of the Formative Potential of NCEA" was very enlightening. He discussed how research evidence suggests that appropriate use of formative assessment promotes effective learning and that contrary to what teachers perceived, students read, valued and used written feedback on assessments to improve their learning.

Once again, for many the panel discussion was the highlight of the evening. This year the topic was titled "Calculators: Is your Lecturer a Luddite?" The panel was ably chaired by Dr Kee Teo, and consisted of Dr Jonathon Godfrey (Statistics), Dr Marijcke Vlieg-Hulstman, Howard Pinder, HOD Maths Palmerston North Boys'High School and Karen Gibbs, College of Education, Ruawharo Campus. It was fascinating to watch the panel discussion evolve from some very diverse views and experiences to a place where all seemed to agree that we need to seriously be considering HOW we teach as well as what we teach. It was also agreed that the assessment system needs to change to account for this new technology.

A delicious meal was provided by Wharerata, courtesy of the Deputy Vice-Chancellor, during which the teachers were able to network with each other and the Massey Staff. On its completion, all were treated to two very interesting talks.

Professor Nigel French Co-Director of the Epicentre and Professor of Food Safety and Veterinary Public Health, spoke about "Using Molecular Tools and Modelling to Identify the Source of Human Food Poisoning." His very enlightening talk (which was fortunately after dinner) also included many graphic power points. He described how by fingerprinting the DNA from bacteria acquired from humans, food, animals and the environment, and using this data to inform statistical models, he has been able to identify the most likely sources of infection and so help manage disease outbreaks.

The evening finished with a fascinating talk on "Scratched CDs and the Mathematics of Error-Correcting Codes" given by Dr Chris Tuffley. As well as being entertained with some lovely music by Crowded House and being shown how to win a game of "Seven questions, one lie", Chris showed us how error correcting codes are used to keep CDs from skipping.

### Allan Wilson Centre news

Barbara Holland reports: The next generation Solexa Sequence Analyser has just been installed. This, the first in the southern hemisphere was officially opened by the Minister for Research, Science and Technology (and MP for Palmerston North), the Hon. Steve Maharey on the 5th October. It increases the volume of sequence data that can be determined by several orders of magnitude generating terabytes of data in each 3-day run. Handling this data, assembling the sequences (a jigsaw puzzle with 10 million bits!), and interpreting the data poses demanding computational and mathematical problems. As the biological and health researchers realise the potential of genome sequencing many new applications will be developed. The AWC is collaborating with some mathematical biology research groups to participate in these developments.

We have two new mathematically inclined PhD students in Palmerston North: Tim White has transferred into a PhD from a Masters programme, his interests are in algorithm design and properties of phylogenetic methods, and the compression of sequence databases. Atheer Matroud Abbas will be joining us in January; he previously worked as a mathematics lecturer at the University of Nottingham's campus in Malaysia. Atheer has a background in combinatorics, and will be working with Mike Hendy on nested tandem repeats in sequence data.

Several members of the AWC (Mike Steel, Pete Lockhart, and Barbara Holland) attended the Isaac Newton Institute's (INI) programme on Phylogenetics. The INI is specially designed to run programmes in mathematics, usually running two concurrently. The Phylogenetics programme began Sept 3rd and runs through until the end of December. Some participants only go for a short period while others stay for the whole 4 months. The aim of INI programmes is to gather many researchers in a particular field of mathematics to the same place at the same time. The Phylogenetics programme included 3 one week blocks that were normal' conferences, but most of the time was unstructured, allowing people to give informal talks, and collaborate with whom they choose.

We held our annual meeting at the Rugby Institute in Palmerston North from the 24th-26th of October. There were a couple of great more mathematical talks: one by Beata Faller from Canterbury on the distribution of phylogenetic diversity under a field of bullets' extinction model; and one

by David Bryant (from the Auckland Maths dept) on why the coalescent process means that sometimes the most likely gene tree does not match the species tree it evolved on.

The next NZ phylogenetics meeting will be held in Whitianga in February. As usual there was very high demand both locally and internationally to attend the conference, which is limited to 60 participants.

### Seminars

**Professor Igor Boglaev** , "Monotone iterates for solving systems of semilinear elliptic equations and applications".

**Professor Robert McLachlan** , "Achieving Brouwer's law of round-off error".

**Professor Mike Hendy** , "Penguins, mitochondria and the harmonic series"

**Luke Fullard** , "Mathematical Modelling of Hydrothermal Eruptions".

### Mathematics Graduate Seminars

**Amanda Elvin** (Institute of Information and Mathematical Sciences, Albany),"Global bifurcation in a neural field model".

*Marijcke Vlieg-Hulstman*

## INSTITUTE OF INFORMATION AND MATHEMATICAL SCIENCES (ALBANY)

After 18 years of service to Massey University on two campuses and in a variety of senior academic and management positions, Jeff Hunter has officially retired. We celebrated his career with a special afternoon tea at the end of November. Jeff will continue to work on his research as an emeritus professor and we look forward to his contributions in the coming years.

The annual IIMS Postgraduate Conference was held on 24 October. The excellent organisation led to a most enjoyable day. Ratneesh Suri won the Best Poster award. Sharleen Harper and Renima Malhotra shared the award for Best Presentation and Amanda Elvin was highly commended for her paper presentation. One more outcome from the Postgraduate Conference is a publication of proceedings that record the day's presentations. This year each paper has been refereed to produce a high standard publication.

Mick Roberts attended the International Conference on Biomathematics 2007 at the Institut Teknologi Bandung, Bandung, Indonesia, 27 29 August 2007 and presented a plenary paper "The pluses and minuses of $R_0$".

Winston Sweatman attended the International Astronomical Union Symposium 246: "Dynamical Evolution of Dense Stellar Systems" in Capri. Winston presented a poster: "Ionisation in binary-binary scattering". Following this conference he visited Professor Bonnie Steves at Glasgow Caledonian University to discuss joint work on the symmetrical four-body problem and to present a seminar: "Mutual destruction in encounters between pairs of binary stars."

After a 2-month period of sabbatical leave in Kanazawa, Japan during April and May this year, Robert McKibbin attended and presented papers at IUGG 2007 (the annual meeting of the International Union of Geodesy and Geophysics, held in Perugia, Italy), where he contributed to a session on volcanic ashfall modelling, and at ICIAM 2007 (held in Zurich), where he had organised a minisymposium on mathematical models for the transport of solid particles by the atmosphere. Robert attended the Applied Maths Day at IRL in August, and the NZ Geothermal Workshop in November; at both meetings he spoke about progress in modelling hydrothermal eruptions. He has also just stepped down from a 3-month period as Acting Head of Institute; Tony Norris has now recovered from severe back problems and is back again as HoI.

Graeme Wake spent much of November lecturing and researching in North America as a Fulbright awardee. He visited the Claremont Graduate School (hosted by Ellis Cumberbatch), University of Massachusetts Lowell (hosted by James Graham Eagle), MIT (hosted by Gil Strang) and University of Western Ontario (hosted by Henning Rasmussen). While in Boston, Graeme and Lil enjoyed the first winter snowfall. Graeme nearly accepted the challenge of a winter swim in the Atlantic, but only got up to his knees.

Howard Edwards attended the 2007 Genetic and Evolutionary Computation Conference (GECCO 2007) at University College London July 7-11 to present a paper and a poster based on joint work with Matthew Walker and Chris Messom. He also attended the Royal Statistical Society's annual conference in York the following week. In the preceding week Howard attended the conference in honour of Emeritus Professor John Deely at the University of Canterbury, Christchurch, as one of John's first PhD students.

Paul Cowpertwait gave a talk at the Annual NZ Hydrological Society Conference in Rotorua (22nd November) entitled "Developments of fine scale structure for point process models of rainfall".

Amanda Elvin attended a two week Computational Neuroscience summer school at the University of Ottawa in June. This was organised by the new Center for Neural Dynamics and Computation at the University of Ottawa and was directed at graduate students and postdoctoral fellows from both the physical sciences and the life sciences. Around 40 students participated, from many different countries. At the conclusion of this she spent a few days in Ottawa working with one of the academic group at the Center and also gave a talk on her work. Following this, Amanda travelled to Toronto where she took part in a one day workshop on perspectives for future directions in Computational and Mathematical Neuroscience. Invited speakers included senior people in the Computational Neuroscience field from mathematical, experimental and theoretical perspectives. Finally, she presented a poster on her work on Turing instabilities in a neural field model at the Computational Neuroscience 2007 conference.

Daniel Walsh, Marie Fitch and Graeme Wake spoke at the NZ math teacher's association conference in September.

Claire Jordan has moved back to Ireland with her husband in mid October.

### Congratulations...

To Gaven Martin on his latest Marsden Grant success with the project "Modern Analysis and Geometry".

To Winston Sweatman for receiving an accelerated progression in Senior Lecturer Range 1.

### Visitors

Teeranush Suebcharoen, who is an exchange PhD student from Mahidol University in Bangkok joined us in September. Teeranush will be working with Graeme Wake and Tasos Tsoularis for one year.

Another exchange PhD student from Thailand, Busaya Pimpunchat, who spent a year here working with Graeme Wake has left us in November.

Ronald Begg completed his Research Fellowship at IIMS and returned to Christchurch.

Lillian Werner completed her Masters degree (thesis title: "Statistical Methods for Detecting Genes Associated with Sperm Competition in Natural Populations of Drosophila, Using Blocks of Tightly Linked Single Nucleotide Polymorphisms") and has returned to the US.

6 summer students in math and stats will be working with us this summer. Jonathan Harris and Hyukjoon Kang will be working with Alona Ben-Tal, Graeme Mak will be working with Carlo Laing, Savindren Iyer will be working with Robert McKibbin, Laura Bear will be working with Mick Roberts and Jianhua "Sam" Xie will be working with Beatrix Jones.

*Alona Ben-Tal*

## NIWA

Chris Palliser has joined the Ecosystems modelling group at NIWA, Hamilton and is now heavily involved in a Rotorua water catchment modelling project with Sandy Elliott, Kit Rutherford and Aroon Parshotam.

*Aroon Parshotam*

## UNIVERSITY OF OTAGO

### DEPARTMENT OF MATHEMATICS AND STATISTICS

We welcome two new Postdoctoral Fellows who have been appointed since the last Newsletter. Dr Luke Bennetts from England is working with Prof Vernon Squire on a Marsden grant. Dr Agnes Radl from Germany is working on a short-term contract with Dr Boris Baeumer where they are investigating several competing models using non-local operators to describe the invasion of alien species into a habitat.

Dr Boris Baeumer gave several invited lectures in the first week of November at a workshop on Stochastic Transport and Emergent Scaling in Earth-Surface Processes at the Tahoe Environmental Research Center in Incline Village, NV, USA. He used the invite to also attend the Geological Society of America 2007 Annual Meeting in Denver, visit with Professor Benson at Colorado School of Mines, Professor Schumer at the Desert Research Institute, and Professor Wheatcraft at University of Nevada, Reno. He also gave a colloquium at the Department of Mathematics, University of Nevada, Reno.

Prof Richard Barker met with collaborators from the Northern Rocky Mountain Science Center and Colorado State University at the Grizzly Bear monitoring Workshop in Bozeman, Mantana at the beginning of October. He also met with Dr Mike Conroy at the University of Georgia to further research begun during Mike's visit to Dunedin earlier this year as a 2007 William Evans Fellow. He also featured on Checkpoint after appearing as an expert witness in an Environment Court Case

on pollution, along with Dr Martin Upsdell from AgReearch.

Mr John Harraway attended the 56th Session of the International Statistical Institute in Lisbon from 22 August - 29 September where he presented a paper entitled Observational Studies, Confounding and Multivariate Thinking. During the conference he attended meetings of the International Assn of Statistical Education and meetings of the Board of the Statistics Education Research Journal as well as a meeting of the International Programme Committee for ICOTS8. John is chairing the International Programme Committee for ICOTS8 to be held in July 2010 in Slovenia. After the ISI John spent five days in Slovenia visiting members of the Local Organising Committee at the University of Ljubljana and seeing the down-town conference facilities.

**Seminars**

**Prof Kambiz Farahmand** (School of Computing and Mathematics, Faculty of Engineering, University of Ulster), "Random Polynomials' '

**Susan Starking** (London South Bank University and 2006 Schools lecturer, Royal Statistical Society of Britain), "Can you see the wood for the trees? Surveys, sampling, estimation and approximation' '

**Peter K Dearden** , "How to put stripes on a bee, (or How I learnt to stop worrying and love computer modelling') ' '

**Gareth Hegarty** , "Solving ODEs in Pharmacometrics' '

**Dr Alec Stephenson** (National University of Singapore), "Exploiting occurrence times in likelihood inference for componentwise maxima' '

**Professor Stephen Duffull** , "An application of MCMC methods for nonlinear hierarchical modelling in clinical toxicology' '

**Dr Agnes Radl** , "Flows in Networks' '

**Assoc Prof C Paul Bonnington** (University of Auckland), "How to exhibit toroidal maps in space' '

**Dr Christopher Fonnesbeck** (Fish and Wildlife Research Institute, Florida and University of Georgia, Athens), "Adaptive Resource Management Optimization Using Reinforcement Learning' '

**Jordana Norrish** , "Language as a tool for thinking what do our gifted mathematics students say? ' '

**Associate Professor Russell Millar** (The University of Auckland), "Assessment of Bayesian Hierarchical Models for Over-dispersed and Zero-inflated Count Data' '

**Professor Willy Hereman** (Colorado School of Mines), "Symbolic Computation of Conservation Laws of Nonlinear PDEs in Multi-dimensions' '

**Associate Professor David Fletcher** , "Profile Likelihood Intervals for Predictions from a Zero-Inflated Model' '

**Computational Modelling Project Presentations**

**Te-Yuan Chyou** , "Arachnophobia Conquered' '

**Hamish Brimble** , "On the Ball' '

**Yikun Wang** , "Monte Carlo simulation for fractional reaction diffusion equation' '

**Mathematics Honours Presentations**

**Iain Dangerfield** , "Simple Groups and Solvable Groups adventures in abstract algebra' '

**Hugo Norton** , "Fun with Alice and Bob public key cryptography and associated number theory' '

**Alex Young** , "Go with the Flow diffusion and the numerics of subordination in a complex flow field' '

**Prof Martin Hazelton** (Massey University), "From Estimation of Traffic Flows to Deconvolution of Densities: Some Statistical Linear Inverse Problems' '

**Associate Professor Nicholas Horton** (Smith College, USA), "Much ado about nothing: methods and software implementations to estimate incomplete data regression models' '

*Lenette Grant*

## UNIVERSITY OF WAIKATO

### DEPARTMENT OF MATHEMATICS

We congratulate Ernie Kalnins on winning the 2007 NZMS Research Award. Quoting the citation, the award was "for his wide ranging, prolific and significant contributions to mathematics, especially

in his research on symmetries of partial differential equations, separable coordinates and superintegrable systems. This research has earned Professor Kalnins an international reputation as a leader in his field". Ernie was able to come back from his overseas study leave in time to attend the Science Honours dinner in Dunedin where the award was presented.

Alfred Sneyd has announced his retirement from 31 January, 2008. He has been at the University of Waikato since 1970. We thank him for his contributions to the department and the university over all these years and we wish him well in his retirement. He won't be entirely disappearing as he will be teaching a graduate paper next year.

The closing date for the two replacements for Alfred and Rua Murray has now passed. A significant number of applications were received. The selection process is now under way.

Alfred spent over two months from October onwards visiting his PhD student in France as well as working with collaborators. Sean Oughton spent the last two weeks of November visiting collaborators in the US. Tim Stokes will leave in mid-December to visit collaborators in Australia.

Ernie, Kevin Broughan, and Stephen Joe will be attending the first joint meeting of the American Mathematical Society and the NZMS. Kevin's PhD student, Qizhi Zhou, attended the NZ Mathematics and Statistics Post-graduate's Conference in Queenstown. She presented a talk titled "Odd multiperfect numbers of abundancy".

Stephen's term as Chairperson of Department is drawing to an end. A replacement has yet to be found. As the Deputy Dean of the School of Computing and Mathematical Sciences is stepping down at the beginning of next year, Stephen will take on the role of Acting Deputy Dean until the end of April. After that, he hopes to be on study leave for the rest of the year.

**Seminars**

**M. Eastwood** (University of Adelaide), "Div, grad, curl, and all that".

*Stephen Joe*

# VICTORIA UNIVERSITY OF WELLINGTON

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

George Barmpalias is now here as a Postdoc supported as a Postdoc by Rod Downey's Marsden. He will be at VUW until July 2008.

Rod Downey was awarded a James Cook Fellowship which begins in 2008. His project will investigate the recent growth area in fundamental mathematics; he will be working in computational complexity theory and in algorithmic randomness. He has also become a Fellow of the Association for Computing Machinery. Rod also recently gave a 45 minute address at the International Congress of Logic, Methodology and Philisophy of Science in Bejing and has just returned from a Dahstuhl Seminar in Germany on Logical Aspects of Infinite Structures.

Noam Greenberg gave an invited talk at the inaugural meeting of the Focused Research Group on Algorithmic Randomness at the University of Chicago. He also visited the University of Connecticut to work with Joe Miller.

Aaron Armour, who was awarded an MSc with Distinction in 2006 for a thesis supervised by Yinhuo Zhang, has now been awarded a Macquarie University Research Excellence Scholarship, offered to "students of exceptional research promise". He will study for a PhD supervised by Ross Street. His project will use the tools of Category Theory to explore the linkages between the algebraic and geometric aspects of string theory.

Victoria's Applied Statistics Graduate courses have been approved for 2008.

**Seminars**

**Frieder Lempp** , "Conflict modelling logic"

**Wang, Ting** , "Nonhomogeneous Hidden Markov Models for Geophysical Hazard"

*John Haywood*

# ROBIN A. WOODING

*6 March 1926 – 19 November 2007*

Robin Alan Wooding was born at Timaru, New Zealand on 6 March 1926 and passed away on 19 November 2007 at his home in Canberra, aged 81. He was educated at Carew Primary School (a single-teacher school located in a Mid-Canterbury farming district) 1933-1938, the NZ Government Correspondence School 1939, Timaru Boy's High School 1940-1941 and Canterbury and Victoria University Colleges of the University of New Zealand 1947-1948, 1949-1950. At V. U. C. he gained an MSc degree with Second Class Honours, conferred in 1951. In 1951 he joined the Department of Scientific and Industrial Research (DSIR). The DSIR provided leave and a scholarship which enabled him to travel to Emmanuel College, University of Cambridge, where he gained a PhD, awarded in 1960, under the supervision of P.G. Saffman in the Department of Applied Mathematics and Theoretical Physics. In 1963 he left the DSIR to work under J. R. Philip in the Agricultural Physics section of the Division of Plant Industry (later within the Centre for Environmental Mechanics), CSIRO, Canberra, Australia. In 1968 he visited the California Institute of Technology on a Senior Research Fellowship. He was a visiting professor at the Johns Hopkins University (1970-1971) at the invitation of O. M. Phillips, and then at the University of Wisconsin (1971), where he worked with P. A. C. Raats whom he had met at Johns Hopkins. In 1972 he rejoined the DSIR in Wellington and continued there until his retirement, on reaching the compulsory retiring age of 60, in 1986. He was awarded a Senior Foreign Energy Scholarship by the U. S. National Science Foundation to attend Colorado State University (1975-76). He was awarded a DSc by the Victoria University of Wellington in 1970.

At the Correspondence School Robin worked at a high school level, and his second year at Timaru BHS was in a fifth form class that studied latin. Having passed the University of NZ's matriculation examination, Robin left school at 15 to work on the family farm, which he did for over four years. He developed his lifelong interest in ham radio and bought the book "Calculus Made Easy" to try to understand the Bessel functions used in the theory of frequency modulated radio transmission. With the aim of becoming a radio engineer he took an ICS correspondence course. In 1946 he was engaged on the temporary staff of the DSIR as a Junior Sounder on the Canterbury Project  a joint UK-NZ combined micrometeorological and radar study of over-the-horizon propagation effects. The observations were centred on the Ashburton Aerodrome.

With his interest in science reinforced, Robin enrolled for a BSc at Canterbury University College in 1947. In 1948 he was invited to work as a summer student at the Biometrics Section of the DSIR in Wellington. The following year, in order to support his studies, he took a part-time job there, assisting with the punched-card computers, and transferred to Victoria University College to complete his BSc. In 1950 he worked full time on his MSc in Mathematics.

In 1951 Robin joined the Geophysics Division of DSIR, at first with the newly-formed Oceanographic Observatory (later Institute), working on ocean wave statistics, and then the Underwater Research Laboratory in Auckland when that was formed, working on physical oceanography. Work on classified research was not his preference, and so in 1955 he transferred to the Applied Mathematics Laboratory in Wellington. He came to the AML when it was expanding from its original brief of Mathematical Statistics into

classical Mathematical Physics, and in particular into work on the NZ geothermal area and in fluid dynamics. His first three published papers were on statistics. In one of them he introduced the multivariate distribution of complex normal variables, which is now widely used by communication theorists. This arose from his interest in the application of random-noise theory to ocean surface waves. A change in topic occurred in 1956, when he became involved with John Banwell on attempts at modelling the convective flow of heated groundwater. Robin published his numerical results, together with experimental results which he obtained in conjunction with Roy Benseman, in the Journal of Fluid Mechanics. This was the first paper from NZ to appear in that journal.

At Cambridge he quickly made his mark. His thesis topic with Phillip Saffman was the growth of fingers at an unstable diffusing interface in a porous medium or Hele-Shaw cell. The senior scientists at the DAMTP decided that he was only suited to being an experimentalist, but as he had no allotted laboratory space he did his experiments on a table in a corridor. This turned out to be an advantage as G. I. Taylor regularly walked past his setup and became interested in the project. In order to better plan his experiments Robin worked out the theory of what was happening, including adapting the solution of Taylor for dispersion during flow in a tube to flow between parallel plates. After the unstable fingering work was published Robin gained an immediate international reputation. Saffman later described Robin as his first and also best ever graduate student.

On his return to Wellington Robin became heavily involved with other DSIR scientists on the modelling of the Wairakei thermal field. It was here that he made a major contribution by establishing the plume nature of the field. He also worked with Frank Henderson on overland and underground flow of water to a stream in a catchment.

At Canberra he conformally mapped, designed and arranged the construction of the large wind tunnel in the basement of the Pye Laboratory which made possible much of the groundbreaking experimental work by the micrometeorology group over the next four decades. His most important CSIRO contributions were in water movement, and with Tom Chapman he published papers on groundwater flow in sloping aquifers. Despite strong opposition from John Philip, who wanted him to spend all his time on turbulence problems, he worked on and solved the problem of the unsaturated flow of water from a disc on the soil surface, and his 1968 paper has been cited 265 times. This theory became the basis for the disc permeameter method developed by Ian White and colleagues for measuring soil hydraulic properties. Robin and the geomorphologist Jack Mabbutt investigated the shapes and alignment of dunes in the Simpson desert, which resulted in two papers.

Robin returned in 1972 to the Applied Mathematics Division, DSIR, where he worked on geothermal energy with Alex McNabb, Elizabeth Bradford, Frances Sutton and Malcolm Grant, and also maintained publications on unsaturated flows. He developed one of the first finite element models of a gasfield, as part of an evaluation of the Kapuni field. He later extended this work, along with Warwick Kissling and Graham Weir, to the Maui gasfield, where Robin identified that dynamic effects in the neck between two gas bodies can maintain their connection in the presence of waterdrive. Robin championed the concept of reconstructing the Pink and White Terraces, by using waste water from the Wairakei geothermal power station, and he produced a novel mathematical model for the spacings between such pools.

In 1988, shortly after his retirement from the DSIR, Robin returned to Canberra, where he was given an Honorary Fellowship (renewed annually) by CSIRO Land and Water. There he and colleagues published a series of papers on convection in groundwater below an evaporating salt lake. In 2007 his listed objectives were to investigate inhomogeneity in porous media and the hydrology of the Murray-Darling Basin. He continued to publish papers until the very last days. Indeed, his last published paper was published in February 2007. In it, Robin showed how an improved formulation of the governing equations of flow and transport in porous media could lead to better agreement between numerically simulated and experimentally observed convective fingering that develops from an evaporating salt lake. Robin continued to think about new scientific problems and solutions to the very end. His mind was still incredibly sharp and curious.

Robin was a member of the American Geophysical Union, the Royal Society of New Zealand, the NZ Mathematical Society and the NZ Hydrological Society. He was also a member of the NZ Forest and Bird Society, and walking, skiing, diving, and playing chess were among his recreational activities.

On 11 May 1957 Robin married Judith Benita Simpson Jowett, who predeceased him. Robin had met Beni at work in the Applied Mathematics Laboratory in Wellington. He is survived by his sons Alan and Kevin, his daughter Josephine, and his stepsons Brian and Ronald Simpson.

Robin did not seek honours. He preferred to spend his time helping other scientists with their problems rather than on flashier activities that might have led to wider recognition. Typically Robin would listen to the description of a problem that a person had struggled with for months, quickly come up with a neat solution to the problem, and then apologize for doing so.

Robin is remembered by his colleagues as a gentleman and a gentle man. He will be greatly missed.

*Don Nield; with the assistance of Brent Clothier, Alick Kibblewhite, John Knight, Robert McKibbin, Alex McNabb, Bert Olsson, Peter Raats, Craig Simmons, Graham Weir, Kit Withers*

## Selected papers of R. A. Wooding

The starred items have been cited over 100 times.

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# FEATURES

## NZMS Travel Grant Reports

### Sophie Pack

At the beginning of July, I travelled to Hobart to present a talk entitled 'Block monotone domain decomposition methods for a nonlinear anisotropic convection-diffusion equation' at the EMAC conference held at the University of Tasmania. This conference brought together both mathematicians and engineers from all parts of Australia and New Zealand. The conference included talks on a wide range of topics including education in maths, modelling of the heart and looking at the movement in MRI coils. The combination of mathematicians and engineers was very informative as the engineers were able to provide me with a different perspective to some of the mathematical problems. They were also able to advise me on the engineering aspect of my own research, which is a huge advantage for me. The conference dinner, held at the revolving restaurant at Wrest Point, not only gave us a chance to interact but also provided us beautiful views of Hobart. Hobart itself is a beautiful place, nicknamed 'little England' with a huge amount of convict history. You can really see the English influence in all the old style houses. I really found this trip to Hobart very informative and enjoyable.

### Wang, Vicky Yang

On 26th of September, I attended the Biomedical Engineering Society Annual Fall Meeting which was held at Renaissance Hollywood Hotel, Los Angeles, California. This year's meeting was sponsored by the University of Southern California, the University of California at Los Angeles and the University of California at Irvine, three of the world's most research focused schools and programs. This meeting was designed to offer a meeting environment that fosters many opportunities for discussion and social interaction. The theme of this year meeting was "Engineering the Future of Biology and Medicine" emphasizing the role engineering and technology has in the biomedical arena. The conference ran over 4 days, podium and poster presentations were categorized into 11 scientific tracks. The wide range of topics attracted great number of biomedical engineers and biomedical engineering students.

I, as a student attendee, presented my poster on "Mathematical Modelling of Left Ventricular Mechanics using Cardiac Magnetic Resonance Imaging" in the Cardiovascular Engineering session. This poster contained the work I have been doing for my first year PhD study since March this year. The work presented in this poster focused on development of a mathematical model of the left ventricle based on geometric data obtained from Magnetic Resonance (MR) tagged images and detailed fibre architecture obtained from Diffusion Tensor Images (DTI). This mathematical model will allow us to gain more insights into the regional function of the LV, hence improved understanding of the underlying structural basis of left ventricular mechanics. With the aid of mathematical modelling technique and computer modelling technique, I was able to attack medical problems in a more effective and efficient and less invasive way. I have received a number of good feedbacks and suggestions on my poster as people were quite interested in the mathematical modelling approach I have taken and the idea of incorporating medical imaging technique into computer models to study functions of human organs. Some research scientists were also interested in the outcome of my further study. Overall, I enjoyed the experiences of attending this conference and received valuable feedbacks for my PhD research project.

**Amanda Elvin**

In June of this year I travelled to Canada to attend a two week computational neuroscience summer school and present a poster at CNS 2007, an international computational neuroscience meeting.

The summer school was hosted by the Center of Neural Dynamics at the University of Ottawa and the main organiser was Andr Longtin of the Department of Physics. Participants were graduate students and postdoctoral fellows from both the physical and life sciences, and were a diverse mix from all over the world. The two week schedule involved lectures in the mornings and computer labs in the afternoons to practise the concepts learnt. The syllabus included dynamical systems theory, single neuron models, spike train analysis, plasticity, population coding and human motor control, with course presenters from McGill University, University of Ottawa and University of Alberta.

We worked in pairs on the computer labs and a project, so that we could learn the language of other disciplines and see both the benefits and difficulties of collaboration. The project involved identifying a neural system that had been modelled using some of the methods covered in the course, coding the computational model using the equations in the literature, reproducing some of the basic results and presenting them to the group at the end of the course. The summer school was very enjoyable as it was an intense learning and collaboration experience where we all worked hard and had a lot of fun!

Following the summer school, I stayed a few more days in Ottawa and gave an informal talk on my work to some of the staff and students. I was also fortunate enough to spend some time working with Axel Hutt, a visiting Research Associate with Andr Longtin. Axel had previously published work on Turing structures in a neural field model with delay and I had applied this to my own work modelling gap junctions as part of the research in my thesis. My results were the subject of my poster for CNS, hence it was a very exciting opportunity. Axel provided excellent feedback and his questions on my results prompted further work upon my return, resulting in a new section in my thesis.

From there I went to Toronto, attending a one day workshop at the Fields Institute on future directions in computational neuroscience, then the CNS conference. The conference has a strong emphasis on experimental results. The presentations of participants showed the richness of this research area, and special workshops and short courses held over the last two days of the meeting permitted more in-depth discussion. My poster was well received and I enjoyed meeting other doctoral students and researchers.

The trip was enormously valuable to me as it motivated substantial new work in the final stages of my PhD and I developed a much broader knowledge of the field than I could have otherwise achieved in New Zealand. Another benefit was the increased networking opportunities offered by staying in Canada for a month and attending several different events.

I wish to thank the following for the generous financial assistance they provided which made my trip possible:

The New Zealand Mathematical Society

The Centre for Mathematical Biology (Massey University)

Education New Zealand

IIMS (Massey University).

# BOOK REVIEWS

Please indicate your willingness to review new books, to the Review Sub-Editor Bruce van Brunt, at B.vanBrunt@massey.ac.nz. Bruce will then organise for you to receive a complimentary copy for reviewing.

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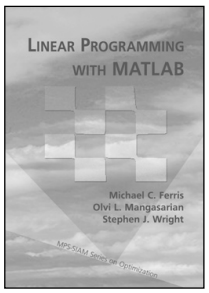


This textbook provides a self-contained introduction to linear programming using MATLAB® software to elucidate the development of algorithms and theory. Early chapters cover linear algebra basics, the simplex method, duality, the solving of large linear problems, sensitivity analysis, and parametric linear programming. In later chapters, the authors discuss quadratic programming, linear complementarity, interior-point methods, and selected applications of linear programming to approximation and classification problems.

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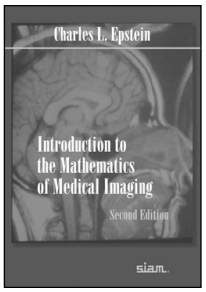
Charles L. Epstein




At the heart of every medical imaging technology is a sophisticated mathematical model of the measurement process and an algorithm to reconstruct an image from the measured data. This book provides a firm foundation in the mathematical tools used to model the measurements and derive the reconstruction algorithms used in most imaging modalities in current use. In the process, it also covers many important analytic concepts and techniques used in Fourier analysis, integral equations, sampling theory, and noise analysis.

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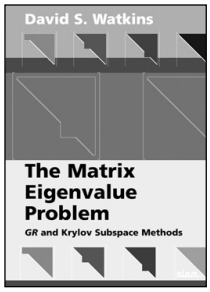
David S. Watkins




This book presents the first in-depth, complete, and unified theoretical discussion of the two most important classes of algorithms for solving matrix eigenvalue problems: QR-like algorithms for dense problems and Krylov subspace methods for sparse problems. The author discusses the theory of the generic *GR* algorithm, including special cases (for example, *QR*, *SR*, *HR*), and the development of Krylov subspace methods.

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Richard J. Gran

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SIAM SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

# CONFERENCES

## Report on the New Zealand Mathematics and Statistics Postgraduate (NZMASP) Conference, November 2007

Building on the success of the South Island Mathematics and Statistics Postgraduate (SIMASP) Conference, held for the first time last year, the 2007 meeting was extended to include postgraduate students from all over New Zealand, making the metamorphosis from SIMASP to NZMASP. Around forty mathematics and statistics students from (nearly) all of the New Zealand Universities travelled to Queenstown for the two day meeting.

The talks at the meeting were diverse, ranging in topic from abstract algebra to Bayesian statistics, from phylogenetics to physiology. The quality of presentations was high with all students taking up the challenge of explaining their work to a more diverse audience than other conferences. Hannes Diener's presentation titled "The Dark Side of Constructive Reverse Mathematics" was chosen for the New Zealand Institute of Mathematics & its Applications (NZIMA) Best Presentation Award. Michael Langton's exceptionally clear presentation on "Surface Reconstruction with Piecewise Radial Basis Functions" earned him the Peoples' Choice Award sponsored by Hoare Research Software (HRS). Michael later revealed that it was searching for the algorithm to most clearly animate his talk which lead to the discovery that the same algorithm which gave the best selection of points for surface reconstruction.

The questions and discussions after the talks made it clear that students had managed to capture the interest of the audience and that they had gained an appreciation of each other's work. The splendid talks were challenged only by the natural splendour of Lake Wakatipu and the mountains right next to the conference venue, making it an excellent setting for an excellent conference.

The meeting was organised single-handedly and superbly by Scott Graybill from the University of Canterbury, with funding from the University of Canterbury Department of Mathematics and Statistics, NZIMA and HRS. With luck, it will be possible to find both funding and an organiser for another conference next year. Roll on NZMASP08!


*Dion O'Neale*

## Conferences Coming Up

January 6 - 12, 2008, Tahuna Function Centre, Nelson: **2008 NZMRI Conference on Conformal Geometry: Summer Workshop on Conformal Geometry and Geometric Approaches to PDE's**.
website: http://www.math.auckland.ac.nz/wiki/2008_NZMRI_Conference_on_Conformal_Geometry

January 14 - 18, 2008, UC Edward Percival Field Station, Kaikoura: **Conference on Finite Groups and Representations**.
website: http://www.math.canterbury.ac.nz/bio/Finite_Groups/

January 28 - February 1, 2008, Wollongong, NSW, Australia: **Mathematics in Industry Study Group Workshop (MISG)**.
website: http://www.uow.edu.au/informatics/maths/research/misg/index.html

February 3-7, 2008, Katoomba, NSW, Australia: **Annual ANZIAM Conference**.
website: http://www.maths.usyd.edu.au/ANZIAM2008/

February 18-22, 2008, The Crown Hotel, Napier: **Meeting on Algorithmics**.
website: http://algo.otago.ac.nz/algorithmics/activities/febmeeting.html

19-22 February 2008, University of Auckland: **Workshop on Multi-scale Modelling of the Respiratory System**.
website: http://www.bioeng.auckland.ac.nz/events/msmrs/index.php

July 14-18, 2008, University of Auckland: **GLADE 2008 Conference on Numerical Methods for Differential Equations and Related Problems**.
website: http://www.auckland-ode-2008.org/

July 21-25, 2008, University of Auckland: **GLADE 2008 Workshop on Numerical Methods for Differential Equations and Related Problems**.
website: http://www.auckland-ode-2008.org/

### Workshop on Algorithmics, Napier, New Zealand

The New Zealand Institute of Mathematics and its Applications (NZIMA) is funding a thematic programme on Algorithmics: New Directions and Applications in 2008. To launch the programme, a workshop is being held in Napier, 18-22 February 2008. The workshop includes two expository lectures by each of the invited speakers, as well as short contributed talks and problem sessions. Invited speakers include:

**Michael Langston** , University of Tennessee

**Steve Linton** , University of St Andrews

**Brendan McKay** , Australian National University

**Michael Mitzenmacher** , Harvard University

**Dominic Welsh** , University of Oxford

For further details of the programme and to register your interest for the workshop, see
http://www.cs.otago.ac.nz/algorithmics/home/
and
http://www.cs.otago.ac.nz/algorithmics/activities/febmeeting.html

We welcome enquires from anyone interested in participating in the programme.

Mike Atkinson (Director, University of Otago), mike@cs.otago.ac.nz
Charles Semple (Director, University of Canterbury), c.semple@math.canterbury.ac.nz
Mark Wilson (Associate Director, University of Auckland), mcw@cs.auckland.ac.nz

# NOTICES

## NZMS Awards

Congratulations to the following NZMS Award Recipients!

### NZMS Research Award

**Professor Ernie Kalnins** (Waikato University). For his wide ranging, prolific and significant contributions to mathematics, especially in his research on separable coordinates and superintegrable systems, that have earned him an international reputation in his field.

### NZMS Early Career Award

Jointly To:

**Dr Noam Greenberg** (Victoria University), for his discovery of new natural definable classes which capture the dynamics of constructions arising from computability theory, his studies of real-valued measures on the continuum and his use of delicate inductive arguments to exhibit links between high compressibility and low computational power, and

**Dr Catherine McCartin** (Massey University), for her fundamental contributions to the development of efficient algorithms for computational problems in a variety of areas, and for her development of theoretical frameworks for parameterized counting problems and for parameterized approximation problems.

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Please fill in where appropriate

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Address: .....

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Academic Affiliation / Official Status / Present Position:

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

Other (give details) .....

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

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

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

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

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

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

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

Dr Winston Sweatman, Secretary, NZ Mathematical Society,
Institute of Information and Mathematical Sciences,
Massey University at Albany,
Private Bag 102 904,
North Shore 0745.

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

# Application for membership of the NZMS

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

Membership categories:

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

| | | |
|---|---|---|
| Ordinary* | \$36 p.a. | |
| Reciprocal | \$18 p.a. | |

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

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

(GST is added to rates for NZ residents.)

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

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

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

Please complete below and mail to:

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

or Fax: +64 (3) 479 8427

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

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NZMS Application Form

Name: _____ Title: _____

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*An institutional address is preferred*

E-mail: _____

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

If Reciprocal then complete this:

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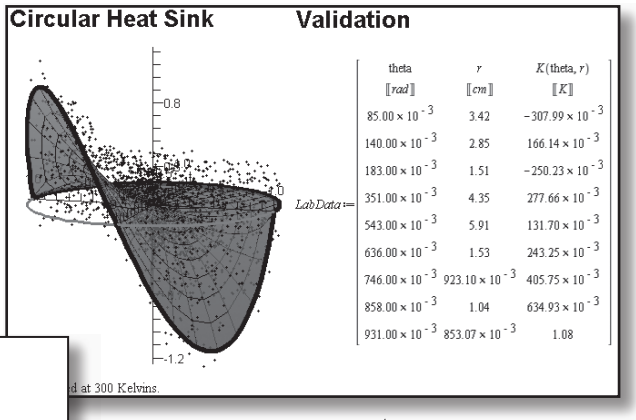


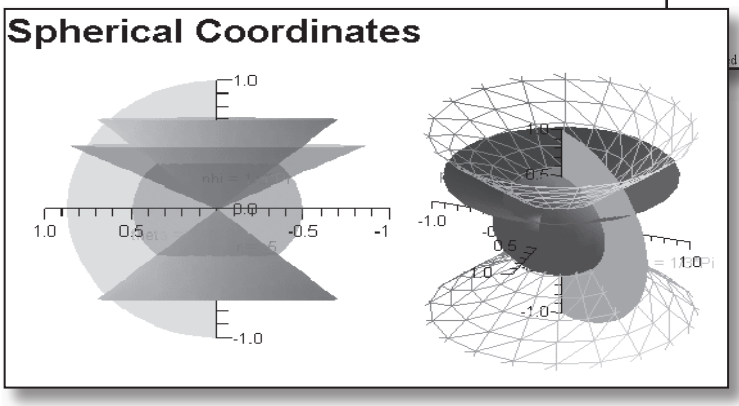


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