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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

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PUBLISHER'S NOTICE

This newsletter is the official organ of the New Zealand Mathematical Society Inc. This issue was assembled and printed at Massey University. The official address of the Society is:
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Web Sites

The homepage of the New Zealand Mathematical Society is:
http://www.math.waikato.ac.nz/NZMS/NZMS.html (Webmaster: stephenj@math.waikato.ac.nz)
The newsletter is available at: http://IFS.massey.ac.nz/mathnews/NZMSnews.shtml
Editorial enquiries and items for submission to this journal should be submitted as text or LaTeX files to r.mclachlan@massey.ac.nz.

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EDITORIAL

ATTEMPT AT A BLOG

A blog (abbreviation of *web log*) was originally an web-based diary, containing links, photos, thoughts, reflections and so on. Now it seems to be broadened to include any regularly-updated web page, although some insist it should have a single author and be arranged in reverse chronological order. Blogs were even featured on Kim Hill recently, with the guests arguing fervently that here was a genuinely new and important means of expression—anyone can join in, everyone has something to say, the market will determine what's worth listening to, and so on. Still, I, notoriously slow to recognize the next sure thing in any event, tended to put them in my "possibly interesting and useful, but on balance, forget about it" basket, right alongside bluetooth, ipod, and unix.

But the other day I heard from an old friend who lives on a tiny island far away. She had been working on a blog almost daily for 4 months. I read it and I was hooked—it was at once personal, reflective, and full of ideas, and the diary structure made it drive forwards (or, strictly speaking, backwards). It was like an 80 page letter from a friend. In one passage relevant here, she argued against the traditional idea that children are better at learning than adults. Instead, they just have heaps more time and no other responsibilities. That must explain a large part of the folk belief that mathematicians peak early.

So I wondered if there were any blogging mathematicians. It would seem a natural form. A top mathematician has ideas and sees connections and things to explain and expound from almost every seminar heard and paper and book read. In theory, it could be the best maths coffee room you've ever hung out in. John Conway could do it.

But so far, nothing much. Mathforge (mathforge.net/index.jsp) has daily entries from a range of contributors, many very interesting, but is more of a chat or news group. Isabel (`www.izzycat.org/math/`), though, is definitely on to something with her math blog. She is a 4th year undergrad at MIT. Here I read about the Silicon Valley billboard which read, in its entirety, "{first 10-digit prime found in consecutive digits of e}.com"; Wittgenstein on games; and about the Euclid 3:16 t-shirt ("The straight line drawn at right angles..."). Jeff Albright's blog (`www.jefallbright.net/mathematics?from=25`) has a category Extropy containing a subcategory Mathematics, with entries on Wolfram, Chaitin, Feynman, the book "The Golden Ratio", and others. Doren Zeilberger's "Opinions" page (`www.math.rutgers.edu/~zeilberg/OPINIONS.html`) is really a blog *avant la lettre*: Opinion 60: Still Like That Old-Time Blackboard Talk; Opinion 47: Hello!, Sir Michael. Have You Ever Heard of the COMPUTER?, or of COMPUTER ALGEBRA?; Opinion 28: Teaching Proofs to High-School Kids and Non-Math-Majors is Child-Abuse. I was sure Rudy Rucker ('Truth and infinity', Proc. AMS 59 (1976); more lately a cellular automata and science fiction guru) would have a blog, but he is just starting. He was a guest blogger on boingboing (inexplicably, one of the highest-rated sites on the net) at `boingboing.net/text/2004_08_15_guestbar.html#109267498643749028`, which gives an idea of his range of ideas. But then, if you're already making money from writing, why start giving it away?

Yesterday

At a meeting we discussed the impact of Massey Council's 7–6 decision not to raise fees next year. Since every other university has now decided to raise their fees, and ours were already low, we are now permanently at a disadvantage, unless the crazy 5% cap system is abandoned. Intead of doing an about face and trying to put a positive spin on the fees freeze, the admin seem bent of spreading fear and dissension, with talk of cuts and layoffs.

Day before

Received the newsletter of the O.R. Society of New Zealand. Best item was about Min and Max, the O.R. Heroes, conceived by Nicola Petty and Shane Dye at Canterbury. They are cartoon heroes who solve problems using O.R. If we have trouble attracting maths students, when maths is the most popular subject at high school, imagine the difficulties faced by O.R., which most students haven't even heard of! Min and Max, what a great idea. `www.mang.canterbury.ac.nz/msci/minandmax/`.

Day before

I was sorry to miss the KerrFest at Canterbury, but I was hoping the media would seize on it and get a few juicy opinions from Roy Kerr. And they did. I can't give you an internet link (the excellent archive at the *Press* closed down when they sold out to stuff.co.nz, which is useless because the articles

are removed almost immediately. They live on for a while as pages with zero in-degree, and google can find them, and for a while longer in google's cache, but then they're gone. I guess they are trying to think of a way of making money from their archive); I have to type this in by hand, the words of Roy Kerr from the *Press* of 28 August 2004:

"You get what you pay for and New Zealand has never paid [academic staff] enough. It is slipping further and further behind. Since I retired (in 1992), the number of administration staff has exploded, the salaries of administration staff have exploded, but the ability of administration staff has imploded. [The universities] still get a good supply of excellent students. Many go abroad later and do very well, either because of, or in spite of, their education here. I would say 'in spite of'. I'm not bitter about it. I'm pissed off. If I was working back here, I would go on strike—not by refusing to teach the students, but by refusing to cooperate with the administration. The university used to be run by professorial boards. Now administrators have taken over."

(His strike threat is not entirely empty. When he was an undergrad at Canterbury, Roy organized a strike by lab assistants, demanding twice the average wage. What would that be today, $40 an hour? They won.)

On returning to New Zealand: "I don't regret it. I don't believe in having regrets. But it was a big mistake coming back." ("A slow death" is how he described it to me once.)

On winning the Rutherford Medal, which has no monetary value, compared to Australia's equivalent prize at A$250,000: "I'm not whingeing, but really, it's a joke."

The Press concludes, "When Kerr returned to Canterbury University in 1971, he found it in far better shape than when he had left in 1955. He then dedicated himself to building it up further in his 20 years on the staff. But the rot has since set in again, he says."

I think I'll leave aside the thorny issue of quality (anyone at Canterbury care to take that up?), but what about salaries? Does he have a case? Massey, the AUS and ASTE have just released a study on academic salaries (`www.aus.ac.nz/media_releases/2004/MasseyResearch.htm`), concluding that they should be benchmarked against Australian academic salaries, which are $5K–$11K more, on average. In addition, Australians get an employee pension contribution of 17%, 12 weeks paid maternity leave, and 3 months long service leave every 10 years. It's not news that Australians are paid more. Nearly everyone in New Zealand would earn more if they moved to Australia. The crucial part of the argument, that NZ and Australia share a common market in academic recruiting, and that failure to keep up with their salaries will hurt our universities, is not really examined in detail. I don't think it stacks up. Salaries themselves are far from the only factor in attracting staff. A strong, vibrant department, quality of students, job security, number and quality of graduate students, institutional support for research, availability of research grants, location, ease of promotion, and (crucially) availability of jobs are all equally important. (Australia has been shedding mathematicians for years.) Overall, salaries are not very strongly related to quality. The UK, after all, has pretty paltry salaries but still attracts good mathematicians from better-paid countries. Starting salaries for lecturers are about $25K in Italy and more than $125K in Switzerland. Professors are actually paid more in New Zealand than in Norway, a country with more than twice the per capita income and twice the cost of living. Years ago there was an article on third world mathematics in the *Intelligencer*. They compared 4 countries: the US (salary US$4000 per month), Mexico ($400/mo), Nicaragua ($40/mo) and Vietnam ($4—can that be right?). In Nicaragua the maths majors were observed chanting "An equivalence relation is reflexive, transitive, and symmetric", while in Vietnam the standard was similar to the US.

Another way of looking at it would consider salary growth over time. My impression (from a single data point, a job ad in a 1981 Newsletter) is that there hasn't been any real growth at all. That does seem a bit off. Real GDP was up 55% in the 12 years from June 1992 to June 2004 (notice I choose my starting point carefully; there was hardly any growth in the previous 8 years), while population has grown only, oh, I don't know, 8%? So who is sharing that growth? The fundamental problem is that growth comes from sectors of the economy that can increase their productivity (farming, manufacturing, business services, tourism) while we are funded by the government, who tend to be involved in areas like education, health, and welfare, that cannot increase their productivity. To keep them going, the government's share of the economy will have to increase. New Zealand has been reluctant to do that, while the US (where academic salaries kept pace with private sector wage increases during the boom years of the 1990s), suprisingly, has not. So it all comes down to how loudly we shout. This must be the subtext to the AUS report.

Day before that

Have a look at the web site of the Otago University Philosophy Department (`www.otago.ac.nz/philosophy`). It is a thing of beauty.

Another day

Went to a seminar by Tom LoFaro on "Do you know what your internet search engine is doing?" Reflect on an application in bibliometry, where paper strength is a function of the strengths of all the citing papers, not just a straight count of citations. However, this still wouldn't detect large, isolated fields full of weak papers furiously citing each other. Also, I might discover that citing me is the kiss of death for a paper. Where would my responsibility lie then? Further research is needed.

Last week

I took my daughter to the book sale at the city library. It was a mixed success, she cried "Someone took my book away!" the whole time (I think she put it down in the aisle, which was only just wide enough for 3 people to squeeze in back to front, and it was kicked away—she was in constant danger of being crushed) but I was amazed to see a couple of metres of NZ poetry first editions being flogged off. We were mostly there for the kids' books at 5 for a dollar but I just had time to spot and grab "Book viii (Wood Engraving Number)" for 50 cents. This turned out to be Caxton Press's 1946 forerunner to Landfall, full of Russell Clark and Leo Bensemann woodcuts. (It's too late to collect the originals, Peter Jackson is buying them all up.) So that counts as a find. A find is hard to define, but you know it when you see it. It's not really something you're looking for—you'll never find that—it's better if it's something you've never heard of but are ready to see. The same thing works in mathematics, presumably, chance favouring the prepared mind. The problems are that (a) the mind has to be fantastically well prepared, and (b) if the find is in someone else's head (still the best repository of maths links), they have to be prepared just so as well. This reduces finds to a second-order effect.

Last month

I was interviewed for the Radio New Zealand show 'Eureka'. You may have heard it: sheep dip, sheep dip, sheep dip, symplectic geometry, sheep dip... It was a new experience but I wasn't very happy with it. Popular mathematics is hard enough anywhere, but on radio??? I only had room in my head for 2 ideas, namely to speak slowly and to speak clearly. Consequently I sounded like a very slow, clear idiot. However, I was impressed by the interviewer, who had gotten a physics degree only a few years earlier and then worked in science journalism. She asked good questions and really engaged with the subject. Maybe journalism is a really good way of learning about something, at least to complement all the technical grunt work? Let's get all our students to interview a faculty member about their research and write a popular science piece on it.

A friend asked me to contribute something on 'Education and Research' for my high school's 125th anniversary volume. A tricky one. For anyone else I'd say no. But anything publishable would be hypocrisy. In primary school I pored over huge prime number sieves looking for patterns, I worked out square roots to a ridiculous number of places, I made truncated icosahedra, and for most of one term I tried to construct a regular heptagon using compass and straight edge (it never quite worked). In high school the only maths extension activity I remember was being told to turn up for the BNZ maths competition. I can say that the syllabus was well taught in maths, which gave it a big edge over the arts subjects, which were a joke. The school orchestra was execrable, whereas today the top school groups sound fully professional. If our schools had shown the same improvement in maths as in music, we'd be turning out dozens of Terence Taos every year.

Robert McLachlan
Massey University

PRESIDENT'S COLUMN

"Maths holy grail could bring disaster for internet". In previous columns I've commented on the media's reporting of mathematics, so this headline in The Guardian on September 7 was irresistible. The paper is commenting on the claim by Louis de Branges de Bourcia of Purdue University that he has succeeded in proving the Riemann hypothesis. The paper says that if this turns out to be true, "financial disaster might follow. Suddenly all cryptic codes could be breakable. No internet transaction would be safe." Professor de Branges' website has a thirty-one page paper entitled 'Apology for the proof of The Riemann Hypothesis'. The Guardian acknowledges that if the claimed, and as yet unpublished, proof is correct we would not necessarily have obtained "a kind of mathematical prime spectrometer," but goes on to speculate that "the proof might be translated into something that might produce this prime spectrometer. If it does, it will bring the whole of e-commerce to its knees, overnight." Wouldn't it be nice to have such power; the million-dollar prize would seem insignificant.

Back on earth, the Raglan meeting (August 30 to September 3) that formed part of the NZIMA Thematic Programme on Dynamical Systems and Numerical Analysis was a pleasant and stimulating week. The standard of presentation by the overseas plenary speakers was excellent, and the contributed papers by locals held their own. The organizers are to be congratulated on an outstanding meeting. The Mathematisches Forschungsinstitut Oberwolfach operates on a more regimented system than an NZIMA meeting at a Raglan motel. I attended a workshop there in October, which was similar in purpose as it brought together a group of likeminded people for a week, in this case working in a more narrowly focused area than the Raglan meeting. Instead of Kiwi informality a gong summoned you to meals, with places laid and named. All participants were required to summarize their work in the record book, in their own handwriting. Browsing back through the entries from previous meetings was fascinating. There is a superb mathematics library at Oberwolfach containing 41,000 books and subscribing to 470 periodicals, and a music room with a Steinway grand piano. The institute provides an environment for meetings and collaborative research in mathematics, and is one of a few such facilities in the world. Clearly the resources required for an Oberwolfach or an Isaac Newton Institute are beyond our financial reach, but the NZIMA-sponsored meetings, and those sponsored by the NZMRI, that I have attended have operated in the same spirit and have fulfilled an essentially similar function. These meetings have become a valuable component of the NZ mathematics scene, and I recommend all members to attend them whenever they are relevant to their research interests.

I would like to congratulate our treasurer Tammy Smith for being presented with the Hamilton Award, for pioneering contributions to the mathematics of the structure and function of proteins and the geophysics of two-phase flows in fractured porous media. I would like to add my congratulations to Alfred Sneyd, whose promotion to Professor at Waikato University was announced in the last newsletter; and to Boris Pavlov and Graeme Wake, who have been elected FRSNZ. The citation for Boris Pavlov speaks of his exceptional international reputation for mathematical analyses that have led to significant advances in wide areas of mathematics including spectral and functional analysis and the theory of Riesz bases. The Society recognizes that Graeme Wake is a talented and versatile applied mathematician who has been instrumental in focusing applied mathematics on issues of specific relevance to New Zealand, particularly in modelling biological systems in the agricultural, health and industrial sectors. The full citations for the fellowships may be found at `http://www.rsnz.org/news/releases/fellows-new2004.php`.

The New Zealand Mathematical Society has now been in existence for thirty years. With John Harper's assistance I have compiled a list of officers and council members over that time. I hope it is accurate, if any corrections are required please let me know.

Mick Roberts
Massey University, Auckland

LOCAL NEWS

AGRESEARCH

The statistics/bioinformatics group have been busy over the past few months as Dave Saville reports below.

The statistics/bioinformatics group had its annual get-together at Ruakura, Hamilton, from 31 March to 2 April. On the first day, new and existing staff all gave talks on topics of interest. This was followed in the evening by our annual group dinner, at the Hydro Majestic Cafe near the river. During the meal we all wished our group leader, Peter Johnstone, a happy 65th birthday (it being imminent), and Roger Littlejohn presented Peter with the Festschrift of collected statistical papers and reminiscences that he had so excellently put together (full details are given elsewhere in this newsletter). Peter was also presented with a monster chocolate cake that we had to help him demolish! On the second day of the gathering we attended Peter Green's workshop on "Structure and Uncertainty: ..." along with many other statisticians. This was followed by (yes, you guessed!) more food, in the form of an excellent buffet dinner at "The Station" restaurant at The University of Waikato. This was a good opportunity to catch up with old friends and colleagues. On the third day we spent the morning strategically planning, including pondering our position in the proposed new structure for AgResearch (since that time, the restructuring proposal has been further restructured following the appointment of Andy West as our new CEO, with the nett result being that our stand-alone group has been preserved intact, but positioned within one of three AgResearch science groups, the Applied Biotechnology Group). Such weighty considerations made for a healthy appetite, so we adjourned for lunch and a short team-building stroll at the Hillside Conference Centre, near Huntly—here we were treated to small quantities of very high quality food, which we subsequently supplemented with bananas and cheese and crackers before bidding each other farewell and flying off into the blue yonder (or simply driving home...).

In July, nine of the group's biometricians attended the 22nd International Biometrics Conference and associated workshops in Cairns. Temperature was a pleasant 25-ish mostly, with a medium humidity. Harold Henderson featured as an invited speaker, talking and demonstrating "Dynamic graphics in statistical consulting." Martin Upsdell presented a paper on "Estimating spatial patterns using a Bayesian/mixed model smoother," Dave Saville on "Robustness of multiple comparison procedures," David Baird on "Mixed maggots: the analysis of a fly competition experiment," and Roger Littlejohn on "Calculating standard errors for finite mixture distributions." Ken Dodds displayed a poster entitled "The number of alleles seen in a mixture," Zaneta Park-Ng's was entitled "Discrimination among milks and cultured dairy products using screen-printed electrochemical arrays," Fred Potter's was "Estimating break points," and Katarina Domijan's was "Modelling thermal destruction of viruses and bacterial cells." The conference was attended by over 700 participants, so in addition to the formal scientific program, it was an excellent opportunity to renew international connections and forge new links. On the social side, many people took a trip to "The Reef" or visited the rainforest, as well as enjoying the excellent conference dinner (yes, more food) and entertainment at the Tjapukai Aboriginal Cultural Park (pronounced "Jabakai").

Some of the mathematical biology group have also been conferencing, abroad and domestically Tanya Soboleva attended the Fifth International Conference on Systems Biology in Heidelberg from 8th–12th October. A sign of the increasing role that mathematics is playing in this field is that the number of participants increased from 300 three years ago to more than 700 this year.

Ken Louie attended the 32nd Annual Meeting of the New Zealand Society for Parasitology at Massey University from Nov 2–3 and presented a talk on "Nematode parasites of sheep: extension of a simple model to include host variability".

Kumar Vetharaniam presented a paper entitled "A composite model of growth, pregnancy and lactation" at the 6th Modeller's Workshop in Farm Animals held in Wageningen, The Netherlands on September 5–8. He also presented a paper entitled "Biocontrol of Varroa using a benign haplotype as an antagonist" at the Nigel Barlow Memorial Symposium held in Queenstown on September 15–17.

Ken Louie

THE UNIVERSITY OF AUCKLAND

Department of Computer Science

Reinhard Klette and Azriel Rosenfeld (of the University of Maryland in College Park), wrote a treatise on "Digital Geometry", which has now been published by Elsevier (656 pages, 2004, ISBN1-55860-861-3). Azriel Rosenfeld was the leading researcher in the field of computer image analysis,

who made fundamental and pioneering contributions to nearly every area of that field over a period of nearly 40 years, until he died on February 22, 2004. A photograph of Azriel Rosenfeld is printed on p. viii, followed by an obituary on pp. ix-x.

Nevil Brownlee is collaborating with NGI-NZ, the NZ Next-Generation Internet society `http://www.ngi-nz.co.nz/`, which has been working for the last few years to promote and represent New Zealand research, innovation and education sectors in next-generation Internet networks, protocols and applications. On June 2, 2004, the Research, Science and Technology Minister, Pete Hodgson announced the next phase in the development of a super-high-speed internet link between universities and research organisations in New Zealand and overseas. MoRST, the Ministry of Research, Science and Technology has appointed Charles Jarvie as Implementation Manager for the network. More details are available from MoRST's 'IT Infrastructure' web page at

`http://www.morst.govt.nz/?CHANNEL=IT+INFRASTRUCTURE&PAGE=IT+Infrastructure`.

We are hosting Professor Jaques Sakarovitch, the director of research at Information and Communication Lab in ENST, Paris, from November 12 to December 17. He is among the best-known experts in automata theory. This visit is partially supported by the NZIMA and the Marsden Fund.

Sasha Rubin has accepted a three-year postdoctoral fellowship awarded by the Foundations for Research, Science and Technology, New Zealand. Sasha will be based with our department. Pavel Semukhin has been awarded The University of Auckland International Doctoral Scholarship for 2005–2008.

The ICT Innovation Academy is looking to be successful. We have 26 students lined up for 18 projects in 12 different organisations. More than 70 students applied for the 26 positions so demand and quality are high. All students are enrolled in a project paper (380/780/Project X) so are contributing EFTS. Many thanks to those who have agreed to be academic mentors. It is particularly noticeable how many of the industry projects are distributed systems based drawing on skills covered in 334 and 335 (or SE equivs). About evenly split between .NET and Java/Open Source based.

Seminars

M Baroni (Canterbury University), "Constructive order completeness".

Professor H Maurer (Graz University of Technology), "Computers and Globalisation".

Associate Professor Akira Asano (Hiroshima University), "Extraction of repetitive structures in textures and its application to the optimization of image filtering".

Dr Denis Hirschfeldt, "Bounding prime and homogeneous models".

Dr Pavel Semiushkin, "Classification of complete theories of Abelian groups", and "An uncountable categorical theory whose only computable model is saturated".

Frank Langbein, "Design intent of geometric models".

Professor James Goodman, "Computer architecture: searching for new kinds of parallelism".

Dr Ondrej Sykora, "Fractional lengths and crossing numbers".

Professor Bakhadyr Khoussainov, "Finitely generated automatic groups".

Professor Bob Doran, "Mechanical totalisators".

Garry J. Tee

Department of Mathematics

Dr David Bryant has accepted the University's offer of a Senior Lectureship in Mathematical Biology, and he will join us in the middle of 2005. David works on tree graphs.

Gaven Martin has resigned, to become a Distinguished Professor of Mathematics at Massey University—Albany.

Norm Levenberg has resigned, to take up a post in the USA.

David Gauld first became Head of the Department of Mathematics on June 1, 1981, and he has spent several terms as HOD. His current term of office will end with this academic year, when Bill Barton takes over as HOD. After 5079 days as Head of Department, David confidently expects that he will not again be called upon for that duty.

Hearty congratulations to Boris Pavlov on being elected as a Fellow of the Royal Society of New Zealand. This is a big honour for the Department, as well as recognition of Boris's power as a mathematician.

And congratulations to Marston Conder on being elected as President-elect of the Academy Council of the RSNZ.

In November, Paul Bonnington was elected President of the Combinatorial Mathematics Society of Australasia at its AGM in Brisbane.

Anthony Blaom has gone on paternity leave (unpaid).

Warren Moors has won a "New Staff" research grant from the University's Research Committee.

Mike Thomas has won a research grant of $158,355 over two years from the New Zealand Council for Educational Research (NZCER), for investigating the impact of technology use on the teaching and learning of mathematics, especially at NCEA levels 2 and 3 (i.e. roughly 6th & 7th forms).

Marsden Awards were won by Jianbei An, Marston Conder and Eamonn O'Brien for "Group actions, representations, structure and algorithms", by Gaven Martin for "Geometry and analysis", by James Sneyd for "Modelling the calcium cardiac transient on multiple spatial scales", by Jiling Cao and Warren Moors for "Analytic Topology", and by Geoff Nicholls.

The NZIMA Programmes have made grants to Vaughan Jones, David Gauld and Roger Fenn (Sussex) for their programme on "Geometric Methods in the Topology of 3-Dimensional Manifolds", and to Geoff Nicholls and David Vere-Jones (VUW).

The three NZIMA programmes that have their main activities during 2004 and early 2005 (all at The University of Auckland) have appointed their postdoctoral fellows. Dr Richard Evans is working on the "Geometry: Interactions with Algebra and Analysis" programme with Eamonn O'Brien and Gaven Martin. Richard recently held a New Zealand Science and Technology Postdoctoral Fellowship at Rice University (Texas) and The University of Auckland, following his PhD at the University of Michigan. Richard started his two-year NZIMA Postdoctoral Fellowship in April. Dr Bart Oldeman will be working on the "Dynamical Systems and Numerical Analysis" programme with Robert McLachlan and Vivien Kirk for 2 years from mid-June 2004. Bart gained his PhD at the University of Bristol, and he has held postdoctoral positions at Bristol and at Ohio State University. Dr Primoz Potocnik and Dr Jana Siagiova will be working on the "Combinatorics and its Applications" programme with Geoff Whittle and Paul Bonnington for one year from September. Primoz gained his PhD at the University of Ljubljana (Slovenia), and he has most recently been a Fulbright Fellow at Northern Arizona University, Flagstaff. Jana gained her PhD at the Slovak University of Technology (Slovakia), and she has most recently been a postdoctoral fellow at the University of Syracuse (New York).

Lee Peng-Yee was a Lecturer here from 1967 to 1970. He then returned to Singapore where he became Professor at the National University of Singapore, and then at the National Institute of Education of Nanyang Technological University. He visited our Department from late November to early December.

Professor Mark Watkins (Syracuse University) visited from October 4 to December 12. His research interests are in graph theory, group theory and combinatorics. Malte Peter (University of Bremen) visited in October. His research interests are in linear water waves, flow in porous media and homogenization theory. Professor Robert McLachlan (Massey University) is visiting for November-December.

John C Butcher made a short visit to Europe in September, and gave lectures at the Universities of Lund and Halle and at the Max-Planck Institute in Leipzig. He also gave a lecture at a one-day conference in Trondheim to celebrate the 60th birthday of Syvert Nørsett.

Marston Conder visited Vaughan Jones at Berkeley in August, then he took part in conferences on discrete groups and manifolds at Aberdeen and Oxford, and visited the Institute for Mathematical Sciences at Singapore.

David Gauld took six weeks of leave in the middle of the year. From 3 to 10 July he attended the 19th "Summer" Conference on Topology and its Applications in Cape Town, where he presented a talk entitled "Analytic=Continuous". This was the second time that the Summer Conference has been held in the Southern Hemisphere; the first time was in Auckland in 2002. From 12 to 16 July he attended a conference on Topology and Analysis in Applications at Didima, in the mountains northwest of Durban, where he presented an invited talk entitled "Conditions equivalent to metrisability for a manifold". He then flew to France where he continued research with Szymon Dolecki of Université de Bourgogne in Dijon. They worked on irregularity in convergence spaces, escaping the heat of the plains for a while in the mountains around the Vénéon valley near Grenoble.

Eamonn O'Brien gave an Invited Lecture at Colorado on "Finite Geometries, Groups and Computation", Colorado, and an Invited Lecture to the Section on Computer Algebra at the German Mathematical Society Meeting at Heidelberg, both in September 2004.

In June, Dr Philip Sharp spent two weeks in Los Angeles and continued collaborations with Dr Kevin Grazier of NASA's Jet Propulsion Laboratory (JPL) and Dr Fred Krogh, a consultant for

JPL. During the trip Philip met with Professor Bill Newman, UCLA, to discuss future collaborations. Several weeks later Philip gave a public lecture in Hamilton on the use of computer simulations to model the Solar System. In late August, he presented a paper on the restricted three-body problem at the Raglan conference on dynamical systems. A month later, Philip presented two papers on N-body simulations of the Solar System at the Computational Techniques and Applications Conference held in Melbourne.

Mike Thomas left Auckland on July 1st to attend the International Congress of Mathematics Education (ICME-10) in Copenhagen, Denmark, held July 4–11, 2004. ICME-10 is a four-yearly worldwide mathematics education conference, and he was invited to give a regular lecture. Over 3000 attend this important conference and only those with a strong international standing are invited to give lectures, which are sub-plenaries. Mike is thought to be the first New Zealander to be offered this opportunity, and he chose to speak on the topic of Versatile Interactions with Concept Representations and the Role of Computer Algebra System Calculators. That talk was very well received by the audience, and as a consequence he was able to make useful contacts with two professors from Germany. A 15-page paper based on the lecture will appear in the conference proceedings later in the year. In addition to the regular lecture he was also an invited plenary panel speaker at the Topic Study Group on the learning of Calculus. In addition to attending ICME-10, he was also a participant in a satellite conference held in Bergen, Norway, July 14–18, 2004. This was the premier worldwide conference in mathematics education, the 28th annual conference of the International Group for the Psychology of Mathematics Education (known as PME28). PME 28 was attended by 484 researchers from all around the world. At the conference Mike presented a refereed paper entitled Integrating CAS Calculators into Mathematics Learning: Issues of Partnership. In addition to attending many useful paper presentations he was also part of the working group on Symbolic Cognition in Advanced Mathematical Thinking. On the way home from the conferences he called in on his research collaborator Professor David Tall of Warwick University in the UK, where they continued their discussions on symbolic cognition, process and object in mathematics, and the possibility of using fMRI scanning techniques to see if they can do anything to detect emotional effects, e.g. does fear depress activity and pleasure heighten it? If so, could this do anything to help us understand mathematics phobia?

Krasi Tsaneva-Atanasova has passed her PhD oral examination on calcium metabolism. Dr Shehenaz Adam has been conferred with her PhD in Mathematics Education. Her thesis, on the development of an ethnomathematical curricular model for the Maldive Islands, was supervised by Maxine Pfannkuch and Bill Barton. Dr Adam is the first Maldive Islander to become a PhD in mathematics, and her family came from the Maldives to attend the ceremony.

In the Mathematics Education Unit, seminars have been given by Piaras Kelly, Sepideh Stewart, Frances Griffin, Kate Niederer, David Godfrey, Hannah Bartholomew, Sheena Parnell, Kay Irwin, Michael Loretz, Bill Barton and Vesi Talamaivao.

Seminars

Dr Mike Meylan, "Linear operator theory and linear water waves".

Dr Anthony Blaom, "Geometric structures as deformed symmetries".

Professor Mark Watkins (Syracuse University, USA), "A characterization of infinite planar primitive graphs".

Simon Marshall, "Rankings of multisets and discrete cones", and "On the existence of extremal cones and comparative probability orderings".

Nodira Khoussainova, "Determinization of Buchi-automata: Safra's construction".

Dr Donald R Love (School of Biological Sciences), "Do fish and mathematics have anything in common (a tale of perturbed gene expression programming)?"

Dr Rosalind Archer (Engineering Science), "The Green element method for solving PDEs".

Dr Arkadii Slinko, "Decision rules, quivers, and relative uncertainty aversion".

Dr Malte A Peter (University of Bremen), "Micro-macro modelling of diffusion-reaction processes in composite materials".

Dr Robert McKibbin (Massey University at Albany), "Getting layered: some experiences with non-homogeneities".

Dr Mick Roberts (Massey University at Albany), "Modelling strategies for minimising the impact of an imported infection—SARS and smallpox".

Professor Alfred Sneyd (Waikato University), "MHD excitation of oscillations in liquid-metal pools".

Dr Shixiao Wang, "Vortex breakdown: how mathematics can help to find the new mechanism in physics".

Dr Sean Oughton (University of Waikato), "Decay of 2D Navier-Stokes turbulence".

Dr Mark Titchener (Department of Computer Science), "Randomness is, as randomness does".

Professor John Butcher, "Diagonally implicit and singly implicit methods for stiff problems".

Dr Philip Sharp, "Elliptic horseshoe orbits and their applications".

Dr Mark McGuinness (VUW), "In a heartbeat—a delay recruitment model of the cardiovascular control system".

Professor James Sneyd, "The mathematics of calcium".

Dr Matt Perlmutter (Massey University), "The geometry of reduced cotangent bundles".

Dr Arno Berger (University of Canterbury), "Digits, dynamics, and Benford's law".

Dr Scott Parkins (Department of Physics), "Quantum chaos with ultra-cold atoms".

Dr Carlo Laing (Massey University at Albany), "Mode locking in a periodically forced 'ghostbursting' neuron".

Dr Rua Murray (University of Waikato), "A convex optimization approach to invariant measures".

Dr Frances Griffin (Macquarie University), "Randomised online quizzes for mathematics".

Dr Judith Ocean (Monash University), "Curriculum change, care and justice in public education in New York".

Dr Sina Greenwood, "Characterising continuous functions on Lindelof spaces", and "PCF theory".

Dr Jiling Cao, "Banach category theorem".

Dr David McIntyre, "A brief history of the normal Moore space conjecture".

Professor David Gauld, "An irregular leave, or what I did in France".

Professor Ivan Reilly & Dr Jiling Cao, "Conference reports".

Professor Robert McLachlan (Massey University), "Another good reason to arrange points on a sphere".

Professor Lee Peng-Yee (National Institute of Education, Singapore), "Subject knowledge in mathematics for school teachers".

Garry J. Tee

Department of Statistics

Dr Sam Ferreira, from the Department of Conservation, has joined us as a Postdoctoral Fellow to work on modelling of ecological metapopulations with Rachel Fewster and Brian McArdle. After joining us in July, Sam fled straight to Africa, where he is doing elephant surveys until January. Eight thousand kilometres of aerial surveys is the easy bit: Sam is also fitting 35 elephants with satellite collars, which is a tricky manoeuvre to say the least. The chosen elephants are thrilled that they can now receive Sky Sports.

We welcome three new PhD students to the City. Heti Afimeimounga, originally from Tonga, is studying with Ilze Ziedins. Debbie Leader has just begun a PhD with Mik Black, and Christian Roever, from Dortmund in Germany, is working on a Marsden-funded scholarship with Renate Meyer. Congratulations to PhD student Steven Miller, who won a Top Achiever Doctoral Scholarship from FRST.

The University of Auckland awarded six Early Career Excellence Awards for 2004, including an award to Dr Rachel Fewster for her project on "Investigating colonisation history of the Norwegian rat using mitochondrial DNA". European rats have a devastating influence on New Zealand's native habitats, and conservationists are attempting to eradicate rats from offshore islands, to create safe sanctuaries for native species. Rachel aims to discover which islands are genuinely isolated from other rat communities, by examining the genetic record. She expects that, by analysing mitochondrial RNA and nuclear RNA, the information gained about the history of rat colonisation will enhance the ability of conservationists to manage island populations.

Professor Claude Belisle, from Laval University in Quebec, is visiting for six months until December. Claude is a well-known name in Bayesian

statistics and MCMC. Professor John Brewster is visiting from the University of Manitoba.

Members of the department have been busy on the conference scene recently. A contingent of nine attended the joint International Biometrics Conference/Australian Statistical Conference in Cairns in July, delivering a total of eight talks, including three invited talks. In August, Alan Lee, Alastair Scott, and Chris Wild were invited speakers at the Fields Institute Workshop on Statistical Methods for Missing Data in Toronto. James Reilly also spoke at the meeting. All four then attended the annual North American Joint Statistical Meetings, also in Toronto, by which time they had found their data.

Not content with this, Chris Wild proceeded to Korea, where he participated in an invited panel session at the ISI Special Conference on "The Vital Role of Statistical Science in Assuring National Prosperity". Soon after that, Chris gave an invited talk at the Japan Statistical Society, and then went to Manchester to give the prestigious opening plenary talk at RSS 2004, on "Statistics education, and connecting practice with research".

Paul Murrell gave the opening keynote talk at the aptly-named UseR! conference in Vienna, the first international conference for R Users. Paul was also selected as Chair-Elect for the ASA Statistical Graphics Section in 2005, and he will be the Chair in 2006. Renate Meyer and Richard Umstaetter each travelled to Germany, where Renate presented a paper at the workshop on Survival analysis in Medicine and Econometrics, and Richard presented work on astrophysical data at the Maximum Entropy conference in Munich. In June, Maxine Pfannkuch attended the IASE Roundtable Conference on "Curricular development in statistics education" in Sweden, and gave a presentation at the 10th International Congress on Mathematics Education in Denmark.

Ilze Ziedins was an invited participant at the Workshop on Spatial Stochastic Modelling, with Applications to Communications, in Edinburgh. Also visiting Edinburgh was James Russell, who slotted in a quick seminar between a month of genetic labwork in Paris and a visit to the Centre for Ecological Modelling in St Andrews. Arriving in St Andrews to find that the incumbents were currently in New Zealand, James had to hurry back to attend their workshop on Estimating Animal Abundance in Christchurch.

Rich Ford attended the Estuarine and Coastal Sciences Association meeting on "Changes in Land Uses: Consequences on Estuaries and Coastal Zones", held in France in September. Rich spoke on the consequences of rainfall for estuarine faunal assemblages.

In the local body elections, Leila Boyle is one of four councillors who received seats in the Tamaki-Maungakiekie ward.

On the personal front, congratulations to Mik Black and wife Mel, on the birth of their bouncing baby boy Liam in April. Meanwhile, Rachel Cunliffe and husband Regan have had a stint in the public eye with their website IdolBlog.com, the unofficial fan site of NZ Idol. The website has had over 7.1 million hits and 190,000 visitors, and has possibly received the most publicity a New Zealand website has ever seen in such a short space of time, including appearances on TV One News, TV3 News, and Holmes, among many others. In an encouraging development, screes of young (alluvial?) fans gave up watching NZ Idol altogether, because they were unable to tear themselves away from the website.

And finally, if you need to brush up on your Portuguese, we have the perfect phrasebook: "Encontros Com O Acaso—Um Primeiro Curso De Analise De Dados E Inferencia", by Chris Wild and George Seber, now retailing for 100 Brazilian reais ($53 NZD). The original title of "Chance Encounters" quaintly translates via Portuguese as "Meeting With Perhaps".

Seminars

Tran Thanh Tam, "Pricing electricity derivative using price duration curve".

Michael Parkinson (The University of Auckland Library), "Tracking your citations".

Steven Butt (Western Michigan University), "Investigation of the effect of nursing activities and the built hospital environment on nurse health and productivity".

Associate Professor YouGan Wang (National University of Singapore), "Parameter estimation for irregularly timed repeated measures".

Associate Professor Alan Lee, "Case-Control, efficiency and semi-parametric regression".

Professor Keith Worsley (McGill University), "Correlation random fields, brain connectivity, and astrophysics".

Associate Professor Chris Triggs, "A model for the analysis of mixed DNA profiles".

Rachel Fewster & Garry J. Tee

UNIVERSITY OF CANTERBURY

Department of Mathematics and Statistics

Congratulations to Marian and Mihaela Baroni for successfully completing their PhDs. Marian's thesis titled "The Constructive Theory of Riesz Spaces and Applications in Mathematical Economics" was supervised by Douglas Bridges, while Mihaela's thesis titled "Hybrid Phylogenies: A Graph-Based Approach to Represent Reticulate Evolution" was supervised by Charles Semple and Mike Steel. We wish them both well in their future work.

Congratulations to Graeme Wake who has just been elected a Fellow of the Royal Society of New Zealand.

Douglas Bridges is off to a Workshop on Constructive Logic and Mathematics in November, followed by two weeks working with Peter Schuster, Josef Berger, Helmut Schwichtenberg and Hajime Ishihara in Munich. The workshop will be held at a monastery in Benediktbeuern, at the foot of the Bavarian Alps.

Ian Coope presented a paper entitled: "Parallel Jacobi methods for derivative-free optimization on parallel or distributed processors" at the 12th International Computational Techniques & Applications Conference, University of Melbourne, September 2004. The venue for the 2006 CTAC conference was confirmed at this meeting to be Townsville, North Queensland - dates yet to be confirmed.

Seminars

Dr Frank Lad, "How big is your mathematics?"

Professor Laszlo Szekely (University of South Carolina), "On subtrees of trees."

Mihaela Baroni, "Hybrid phylogenies and rooted SPR operations."

Dr Robin Turner, "Independent component analysis of personality and symptoms of depression and statistical parametric mapping of personality and brain function."

Dr Carmela Cappelli (University of Naples Federico II), "Splitting along directions in tree based methods: an application to the study of the US business cycle."

Professor Dan Velleman (Amherst College), "Taylor series by nonstandard analysis."

Dr Hannah Bartholomew (The University of Auckland), "Experiences of undergraduate mathematics: identity, belonging and emotion."

Professor Chris Glasbey (BIOSS, Edinburgh), "Spatial and temporal models for non-Gaussian weather variables."

Dr Peter Johnstone (AgResearch), "Bioinformatics in agriculture."

Professor R. Bruce Richter (University of Waterloo), "Partitioning graphs into graphs of given type."

Dr Ganes S Ganesalingam (Massey University), "Teaching statistics memorably."

Ronald Begg, "On a functional equation model of transient cell-growth."

Marian Baroni, "The constructive theory of ordered vector spaces."

Professor Jon Chapman (University of Oxford), "Exponential asymptotics and nonlinear eigenvalue problems."

Mihaela Baroni, "Minimizing the number of hybrid events for a consistent evolutionary history."

Charles Semple

INDUSTRIAL RESEARCH LIMITED

IRL moved to a project-based management system on November 1. As a result the Applied Maths Team became part of a new "Maths and Physics Operations Group". While Applied Maths will retain an identity within this Operations Group, we will cease to be a cost centre and individual research projects will now be managed outside the old discipline-based team structure. For example, Graham Weir has become the Nanotechnology Platform manager and will manage all research on nanotechnology at IRL.

On a less confusing note, Warwick Kissling successfully defended his PhD in October. His thesis, entitled "Deep Hydrology of the Geothermal Systems in the Taupo Volcanic Zone", has identified the mechanism which controls the location of the geothermal fields in the TVZ and has lead to three journal publications. Dr Kissling will officially graduate in May 2005.

We have a number of new faces about, including Young Hong, from VUW, who will be working on chaotic mixing in microfluidics. We also have three summer students from VUW: Martijn Jaspearce and Jonathon Stephenson are working with John Burnell on microfluidics, and Dmitri Schebarchov

is working with Shaun Hendy on phase transitions in finite systems.

Graham Weir respresented New Zealand at the 2004 IUTAM Congress in Warsaw in August. Graham notes that the Australasian bid for the next IUTAM Congress in 2008 was successful. It will be held in Adelaide, with Ernie Tuck chairing the organising committee.

Shaun Hendy was part of a Minsterial Science delegation to China, Korea and Japan in August. As the nanotechnology delegate he visited 9 Asian Nanotech Insitutes, giving talks on New Zealand's Nanotechnology research and looking for potential collaborations and partnerships. As a result of the trip we are hoping to host a number of return visits, including a Korea-NZ minisymposium on Nanobiotechnology in March 2005. Shaun also attended "Materials and Complexity II" in Kioloa, NSW in November, giving a talk entitled "Computational and Theoretical Nanoscience". He also gave a talk on "Not so Many Body Physics" at the Bioengineering Institute at Auckland in October and a shorter version at the Wellington-Manawatu Applied Maths day at Massey.

Finally, Stephen White visited Japan in October. He visited RITE near Kyoto and JAPEX in Tokyo.

Shaun Hendy

MASSEY UNIVERSITY

Institute of Fundamental Sciences (Palmerston North)

Mathematics

Double, double toil and trouble... The decision by the University Council, not to increase fees, immediately resulted in panic and drastic measures and the usual threat to academic positions. Straight after this decision rumours quickly spread about possible redundancies. The Chancellor even spoke of a reduction in permanent staff numbers. Although not necessarily as a consequence of the latter, members of the College of Sciences received from their Pro Vice Chancellor a copy of a document entitled "Sustaining Excellence in Research and Teaching". This document recommends the reduction of 60 current staff (45 academic and 15 general) in the College of Sciences through a voluntary resignation scheme. Will this turn out to be a repositioning of the second kind? And how can one sustain excellence in research and teaching with fewer staff?! When will it ever stop?

Robert McLachlan and Brett Ryland are in Auckland for six weeks as part of the NZIMA programme on "Dynamical Systems and Numerical Analysis".

Igor Boglaev, Dean Halford, Peter Kelly, Tammy Smith, Gillian Thornley and Marijcke Vlieg intend to venture south to attend the 2004 New Zealand Mathematics Colloquium held at the University of Otago.

Charles Little and Kee Teo will be attending the "Conference in Combinatorics and its Applications, in association with the 29th Australasian Conference in Combinatorial Mathematics and Combinatorial Computing (29th ACCMCC)", held at Taupo, 13–18 December 2004.

As the year is divisible by two it was the turn of the Mathematics Discipline at Massey to host the 7th Manawatu-Wellington Applied Maths Conference (2004). This event was being sponsored by IFS and ANZIAM (Australia New Zealand Industrial Mathematics) and was organised by Igor Boglaev and Marijcke Vlieg. It had been touch and go whether this meeting would go ahead as it proved difficult to find an optimal day (as far as participants were concerned). We had targeted for the Friday in the first week in September as that was the only week the universities have in common in semester 2 and that we are free of the extramural contact courses. To 'help' the matter Massey has only one week study break. Alas this was not to be so as this date coincided with the last day of the "International Workshop on Dynamical Systems and Numerical Analysis" held in Raglan. When the date was set to be the 20th of October (the first study week), David Parry fought a brave battle (and won) with Examinations to get custody of Aston 1 for that day.

It was very pleasing that 26 mathematicians (seven from Industrial Research Limited (Gracefield, Lower Hutt) and Victoria University, two 'Albanians' (Robert McKibbin and Carlo Laing), Aroon from Landcare, two from IIST and with the remainder from IFS) were able to attend this meeting. The variety and quality of talks were great and so was the presentation! What to do without the modern technology! Morning tea was provided by ANZIAM. Drinks, biscuits and other requirements were met by IFS. The Conference was again a success and the Maths Mob converged to the Bath-House to celebrate this with recovery drinks and dinner.

Trifecta for the IFS mathematicians. At the Royal Society of New Zealand's Academy meeting on November 17 in Christchurch, not only was our former HoD Professor Graeme Wake (now at Massey University, Albany) elected to a fellowship in the society, but medal awards were announced for two of our former PhD students.

Tammy Smith (now on the staff at IFS) won the Hamilton Memorial Prize. This prize is awarded annually for the encouragement of beginners in scientific or technological research in New Zealand or in the South Pacific, for work published during the period of registration for PhD and up to five years following conferral of the PhD degree until 30 June in the year of the award.

Paul Gardner (now a post-doc at the Department of Evolutionary Biology, University of Copenhagen) won the Hatherton Award which is awarded annually for the best scientific paper by a PhD student at any New Zealand university in the Physical Sciences, Earth Sciences and Mathematical and Information Sciences.

Both Tammy and Paul made extensive computations using Helix in their research.

Allan Wilson Centre

Trifecta too for the Allan Wilson Centre. Not only did Paul Gardner (AWC PhD student supervised by Mike Hendy and David Penny) earn the Hatherton medal, but at the same ceremony, our former PhD student, Mike Steel, (now Professor at Canterbury, and Director for Biomathematics Research) delivered his "New Fellows" seminar, but at the Science Awards presentation that evening, David Penny (who we now claim as an honorary mathematical biologist) was presented with NZ's premier science award, the Rutherford medal by Minister of Science, Pete Hodgson (another Massey graduate).

Other AWC news. Two of our students will graduate on the 26th of November. Paul Gardner and Lesley Collins will be awarded their PhDs. Lesley is continuing as a post-doc in the Allan Wilson Centre, working on computational genomics. Mike Hendy has just returned from a 4-day excursion to California, principally being the lead Keynote Speaker at the 6th Annual "Mt Baldy Mathematics Conference" at Harvey Mudd College, Claremont, sponsored by the National Science Foundation. This year's topic was "Geometry, Algebra and Phylogenetic Trees." The other presenters were David Bryant (McGill, but about to move to Auckland University), Susan Holmes (Stanford) and Bernd Sturmfells (Berkeley). Mike spent two days at Berkeley en route to Claremont.

Meantime the upgrade to Helix (now "Double Helix") with the installation of a further 20 64-bit dual processors, has just been completed, speeding some computations up by a factor of 5.

Seminars

Dr Rod Gover (The University of Auckland), "From the Maxwell equations to global conformal invariants".

Associate Professor Bruce van Brunt, "Conservation laws for parabolic PDE's".

Robin Rutherford, "Student confidence & the CUP maths course".

Professor Laszlo Szekely (University of South Carolina), "On subtrees of trees".

Professor R Bruce Richter (University of Waterloo, Canada, New Zealand Mathematical Society Visiting Speaker), "A simple proof of Grotzsch's Theorem".

Xingyou (Philip) Zhang, "Asymptotic smoothing effect for a damped equation of shallow water equation type".

Marijcke Vlieg-Hulstman

Institute of Information and Mathematical Sciences (Albany)

Congratulations to Graeme Wake who has been elected a Fellow of the Royal Society of New Zealand. He has been praised as "a talented and versatile applied mathematician who has been instrumental in focussing applied mathematics on issues of specific relevance to New Zealand, particularly in modelling biological systems in the agricultural, health and industrial sectors". He is lauded for his "world-class work" and for having "significantly advanced the teaching and application of mathematics in New Zealand". He is also cited for the inspiration provided to students and collaborators by his enthusiasm and energy to which many of us can attest.

Graeme is a founding member, former President (twice), and Fellow of the New Zealand Mathematics Society. He was the first New Zealander to be elected President of ANZIAM and currently directs the Mathematics-in-Industry Study Group (MISG).

During August, Jeff Hunter was in Europe and Graeme Wake in Korea.

Jeff Hunter was an invited speaker at the 13th International Workshop on Matrices and Statistics in Bedlewo, Poland. Jeff says that the Polish hospitality was overwhelming and that the conference was a superb opportunity to meet and discuss research in a quiet relaxing environment. There were approximately 90 participants, who stayed together at a very new Conference centre built by the Polish Academy for the Mathematical Sciences but attached to an old Palace. Jeff continued on his travels on to the COMPSTAT 2004 conference in Prague, which was much bigger with around 500 participants.

Jeff Hunter is Chair of the Local Organising Committee for the 14th International Workshop in Matrices and Statistics IWMS-2005 to be held on the Massey Albany Campus March 29–April 1, 2005 (see `http://iwms2005.massey.ac.nz`). During his travels he was also able to meet and encourage potential participants to attend IWMS-2005.

Graeme Wake completed a month in (very hot) South Korea, where he was hosted as a Visiting Professor in the Division of Applied Mathematics, Korea Advanced Institute for Science and Technology (KAIST). He was an invited speaker at the Korean Applied Mathematics Forum and the associated Mathematical Biology Workshop in Geongju. He says that he just missed the typhoon in Geongju by a day. He flew on to Seoul to join the NZ Science and Technology team led by Minister Peter Hodgson. In KAIST he taught a 3-week postgraduate course in Applied Mathematics, and directed the second Korean Industrial Mathematics Initiative which is something like an MISG, but more like a standard conference. He also visited the CMI in the National University of Singapore en route to explore collaboration and give an invited talk.

On his return, Graeme Wake joined Mick Roberts and Carlo Laing at the NZIMA meeting on Dynamical Systems and Numerical Analysis in Raglan. Graeme talked about "DDDEs", Mick talked on "Integral equation models for the dynamics of epidemics" and Carlo talked on "Spiral waves in nonlocal equations".

Graeme was off again for another nine days in October. He was an invited speaker by Chulalongkorn University in Bangkok, where he gave seminars, lead workshops and gave advice on the initiative to develop Industrial Mathematics in Thailand.

In July, Carlo Laing attended the SIAM Life Sciences Conference and Annual Meeting in Portland, OR in July, speaking at the Life Sciences Conference on "Spiral Waves in Neural Field Equations". He then spent several days at the University of Houston, discussing possible collaborations. In a period of a fortnight he gave departmental seminars on opposite sides of the world upon "Mode locking in a periodically forced 'ghostbursting' neuron" (University of Houston, Houston, Texas on July 20 and The University of Auckland on July 29).

Mick Roberts also presented his work both near and far. He talked about "Modelling strategies for minimising the impact of an imported infection—SARS and smallpox" in a departmental seminar at the Institute of Fundamental Sciences, Massey University, Palmerston North on July 30 and at the mathematics department, The University of Auckland on October 5. He attended the meeting "Design and Analysis of Infectious Disease Studies" at Oberwolfach, October 17–23, presenting papers on "Invasion of exotic infections" and "Identification of reservoirs of infection".

Shaun Cooper went to National University of Singapore for two weeks in September to visit Heng Huat Chan and give a talk "Sums of Squares and Sums of Triangular Numbers".

Robert McKibbin and Carlo Laing participated in the Wellington/Manawatu Applied Maths Day. Their respective talks were on "Getting layered: Some experiences with non-homogeneities" and "Spiral waves in neural field equations".

Robert also gave a seminar on used layering to model systems with continuously-varying physical parameters at The University of Auckland and an Inaugural Professorial Lecture (about 8 years late!) on "Mathematics: Something for everyone" at Massey University, Palmerston North. He also attended the AustMS annual meeting in Melbourne and took part in various AustMS Council meetings in his role as Chair of ANZIAM.

On the near horizon, we have the Mathematics-in-Industry Study Group MISG2005: January 24–28, 2005 directed by Graeme Wake (see `http://misg2005.massey.ac.nz`).

We welcomed Gaven Martin who joined IIMS as Professor and Distinguished Chair in Pure Mathematics in November. We also welcomed Ratneesh Suri, who has joined IIMS as a Graduate Assistant in Mathematics. Ratneesh is beginning study for a PhD under the supervision of Tasos Tsoularis. We said goodbye to Denny Meyer, Associate Professor of Statistics, who left IIMS in October to take up a position at Swinburne University of Technology, in Melbourne.

Again the Massey's Albany mathematicians were well represented in the Auckland marathon. Shaun Cooper and Winston Sweatman completed the Full Marathon and Mick Roberts completed the Half Marathon.

Visitors

Amos Gera from Israel has been at IIMS for Semester two

Seminars

Amanda Elvin, "Pattern formation in neural models".

Denny H Meyer, "Massey's Centre for Data Mining—Its aims and activities" and "Data Mining".

Nicoleen Cloete, "Simulation of ancestral selection graphs for Monte Carlo integration".

Winston L Sweatman, "Modelling the astronomical N-body problem".

Beatrix Jones, "Balancing population size and genetic information in parentage analysis studies".

Kate Smith (School of Business Systems, Monash University, Australia), "Data Mining @ Monash: a collection of case studies and projects".

Amos Gera (Israel), "Consecutive k-out-of-n models for quality control and qualification tests".

Carlo Laing, "Binocular rivalry".

Heung Yeung (Frederick) Lam, "Sums of two squares and a conjecture for sums of $8t$ squares".

Daniel Walsh, "Accurate and efficient curve detection in images: the importance sampling hough transform".

Frank C Langbein (School of Computer Science, Cardiff University), "Design intent of geometric models".

Galkadowite Senaratne, "Microwave signal application for breast cancer detection".

Beatrix Jones, "Modelling microarray data with gaussian graphical models".

Peter Schwerdtfeger (IFS, Massey University at Albany), "The Dirac equation".

Geoff Nicholls (The University of Auckland), "Measurably evolving memes: new models and inference tools for meme-trait data".

Sean Oughton (The University of Waikato), "Decay of 2D Navier-Stokes Turbulence".

Rolf Jeltsch (ETH Zurich, Switzerland), "Inverse aerodynamic shape design of gas turbine blades".

Winston Sweatman

UNIVERSITY OF OTAGO

Department of Mathematics and Statistics

The Department is pleased that Professor Mark Meerschaert of the University of Reno, Nevada, has been appointed to the Chair of Applied Mathematics (vacated by Vernon Squire) and will take up his position in February next year.

Congratulations to Dr Robert Aldred who has been promoted to Associate Professor.

Dr Richard Martin of Wirksworth, UK, has been appointed to a Fixed Term Statistics Lectureship from 1 February 2005 for one year.

Gareth Vaughan began his position as Assistant Research Fellow in August on Vernon Squire's Marsden Grant. Gareth took his Honours and Masters degrees here at Otago and his PhD studies at Waikato.

Terry Cole, our Computer Analyst Programmer/Systems Administrator, left to take up a similar position in the same building with the Physics Department. Terry had been with us for eight years and will be sorely missed.

Greg Trounson, already on our computer staff, has been promoted to this senior position. Greg and his wife, Rachel, had a baby son, Josiah on 16 September. Both these events are cause for celebration. Unfortunately, they both happened at about the same time, so Greg was an extremely busy man for a few weeks, trying to have parental leave while performing two people's jobs!

Dr David Benson has been visiting from Desert Research Institute in Reno, Nevada, working for the past five months with Dr Boris Baeumer on a fractal calculus book.

The Problem Challenge competition, run by John Curran and John Shanks, continues to flourish. This year over 40,000 year 7 and year 8 children from more than 650 schools took part. The competition comprises five sets of questions each with five questions to be answered in thirty minutes; the sets are done about a month apart. Schools return their results on line and can then compare their own results (confidential to them) with the overall population performance. At the end of the year they run a Final Challenge competition for the best performing children in the general competition. The questions in this final competition are really very challenging ones that many first year university students would struggle with—but despite that as usual there were a number of near perfect scores.

Seminars

Peter Robinson (London School of Economics), "Fractional Cointegration".

Ray Hoare (Hoare Research Software Ltd, Hamilton), "STATISTICA in Research".

Ray Hoare (Hoare Research Software Ltd), "An introduction to MATLAB 7".

Claire Cameron "Mark-recapture models in epidemiology".

Graeme Hocking (Murdoch University, Western Australia), "Selective withdrawal from stratified water bodies".

Mark Meerschaert (University of Nevada), "The Fractal Calculus Project".

David Gao (Virginia Tech, Blackburg, USA), "Duality, Triality and Unity in Mathematics and Science".

Andrew Lonie (Department of Conservation), "Maths in the workplace: the third way".

Ken Dodds (AgResearch, Invermay), "Genetic evaluation with DNA-derived pedigree information".

Bernard Robertson (Editor, New Zealand Law Reports and The New Zealand Law Journal Wellington), "Forensic science: Wrong answers or wrong questions?"

Stephen Cranefield (Information Science), "Mathematics and multi-agent systems".

Richard Barker, "Searching for the Peace of Cod: Monitoring the restoration of native fish communities on the Murray River".

Associate Professor Hamish G Spencer (Department of Zoology and Allan Wilson Centre for Molecular Ecology and Evolution), "Some difference-equation models in the population genetics of genomic imprinting".

Kate Brown (Finance and Quantitative Analysis), "The use of problem-based learning techniques in the first year statistics course in commerce".

Mike Atkinson (Department of Computer Science), "A recreational problem and its cryptographic applications".

John Hannah (University of Canterbury), "Pictures versus Algebra".

David Fletcher (Proteus Wildlife Research Consultants), "Assessing population trends".

Tony Aldridge (Southnet, Christchurch), "Modelling accretionary growth on smooth outlines".

Jason Rabbitt "Modelling one-day international cricket".

Professor R Bruce Richter (University of Waterloo, Canada New Zealand Mathematical Society Visiting Lecturer, 2004), "A simple proof of Grötzsch's Theorem".

Chris Glasbey (Biomathematics & Statistics, Edinburgh), "Spatial and temporal models for non-Gaussian weather variables".

Laimonis Kavalieris, "Statistical analysis of regional temperatures".

Fourth year mathematics projects:

Floris Ernst, "Multiplicative ideal theory".

Graham Beck, "Diffusion and the random walk".

Andrew Sykes, "Lagrangian and Hamiltonian formulations for continuous systems and fields".

Geoff Walmsley, "Fractional diffusion and its applications".

Presentations of COMO projects:

Elke Braun-Elwert, "An introductory model of the dynamics of skiing".

Brett Glensor, "Volcanic eruptions".

Kim Mckelvey, "Simple passive dynamic walking".

Scott Graybill, "Computational calculation of lift and drag for wind turbines".

Dave Benson (Desert Research Institute Reno, USA), "Fractal filters and fractional calculus in your backyard".

Warren Palmer, "STAT 110: Whither or Wither?"

Lenette Grant

Department of Computer Sciences

Alexis Angelidis, a PhD candidate in the department recently won the best paper award at Pacific Graphics 2004, for a paper entitled "Swirling-Sweepers: Constant-Volume Modeling" (`http://www.cs.otago.ac.nz/postgrads/alexis/publications.html`). Both Michael Albert and Michael Atkinson spoke at the second international conference on Permutation Patterns, which took place in Nanaimo, British Columbia

in July. The first conference was held in 2003 at Otago, and the next will be in Gainesville, Florida (`http://www.math.haifa.ac.il/toufik/conf_2005/pp05.html`). Michael Albert also spoke at FPSAC in Vancouver, and the CMS summer meeting in Halifax. The "Theory Group" has now expanded to include seven staff members from Computer Science and the Department of Mathematics and Statistics. More information is available at `http://www.cs.otago.ac.nz/staffpriv/mike/TheoryPages/Welcome.html`.

Michael Albert

THE UNIVERSITY OF WAIKATO

Department of Mathematics

We welcome Dr David Pontin from the University of St. Andrews in Scotland as a new post-doctoral fellow in the department. He will be joining our other post-doctoral fellow, Gabriel Fruit, to work with Ian Craig, Alfred Sneyd, and Sean Oughton on their Marsden Fund project which is investigating turbulence and magnetic reconnection in the solar atmosphere.

This has been a busy year for the whole department with student:staff ratios of nearly 23:1 though there may be some relief in sight. The department has recently been given permission to advertise for a new lecturer who we hope will be able to start around the middle of next year.

Tim Stokes spent some time visiting Australia in late August and early September and will be heading back there for a period of about a month straight after the New Zealand Mathematics Colloquium. Tim is not the only member in the department going to the Colloquium as over half the department are heading south. This includes nearly all the members of the department on the organising committee of the ANZIAM2005 conference. Perhaps this is just coincidence or they're going down there to get some tips.

Besides being Treasurer of ANZIAM2005, Rua Murray has also been busy helping to organise a workshop on scientific computation, bifurcation theory, and geometric mechanics. This will already have taken place by the time this column is seen by readers.

Ian's term as Chairperson of the department ends at the end of the year. He will be replaced by Alfred for the first six months of next year. Then in early July, Stephen Joe will become Chairperson after getting back from study leave. He plans to spend four months of his leave period visiting his research collaborators at the University of New South Wales.

Ernie Kalnins is currently on his study leave which is being spent in the US and in Mexico.

Seminars

V Sinescu, "Construction of rank-1 lattice rules based on the general weighted star discrepancy".

R Casey, "Harmonic prime numbers".

R Richter (University of Waterloo), "A simple proof of Grötzsch's Theorem".

M Harmer (The University of Auckland), "Conformal mappings of the triangle groups and a theorem for weighted Laplacians".

A Iserles (University of Cambridge), "Highly oscillatory quadrature and its applications".

S Waldron (The University of Auckland), "An introduction to tight frames".

Stephen Joe

VICTORIA UNIVERSITY OF WELLINGTON

School of Mathematics, Statistics and Computing Sciences
Te Kura Tatau

Yes, we are now operating under a new name! The new English name gives recognition to the three main discipline areas in which we teach and conduct research. In particular, we are pleased that statistics is now explicitly included, while its sister disciplines revert to their standard titles. The new Maori name reflects the sense of connection between the disciplines, capturing concepts of calculation, computation and data collection. The acronym is rather catchy: SMSCS.

Our Head of School, Peter Donelan, is stepping down (or sideways?) to return to core activities of research and teaching mathematics, after three years and a job very well done. John Hine, Professor in Computer Science, has bravely put his hand up and will start as our new Head on 1 December.

MSCS student Ranald Clouston has been awarded a prestigious Woolf Fisher Scholarship, which provides full financial support for three years of doctoral research at Cambridge or Oxford, to the value of around $100,000 per year. There were only three of these awards available nationally. Ranald recently completed an MSc under a scholarship from the NZIMA Logic and Computation programme. His research thesis, supervised

by Rob Goldblatt, was a study of certain category-theoretic objects called *coalgebras* that are useful for modelling data-structures and state-transition systems. He is planning to join the Theory and Semantics Group at the Cambridge Computer Laboratory.

The MSCS Geometry course MATH 308 was voted Most Challenging and Stimulating Course (Science) in this year's Victorias Awards. The 'Victorias', organised by the Victoria University Post-Graduate Students' Association (PGSA), are awarded annually as a means of recognising excellence at VUW, and all members of the VUW community are eligible to nominate or vote for various categories.

MATH 308 Coordinator Dr Ken Pledger, continues MSCS' record of excellence in the Victorias; The 2003 Victorias Award for Most Challenging and Stimulating Course (Science) was won by Dr Marcus Frean's Machine Learning course - COMP 421. Dr Pledger was also given a Highly Commended award in the Best Lecturer Category. Other recipients included MSCS Administrative Assistant Rowan McCaffery who was awarded 'Highly Commended' in the Best General Staff Person Category.

Distinguished alumnus Shayle R Searle made an endowment to Victoria University in 2002 to support an annual Visiting Fellowship in Statistics, Professor Alan Agresti of the University of Florida holding the first such fellowship the following year. This year we welcomed Professor Frank Critchley of the Open University for the last two weeks of October. He has given seminars on his recent joint research on a novel approach to skewness and on the case sensitivity function approach to diagnostics and robustness.

In the 2nd trimester of 2004, Professor Estate Khmaladze of the Statistics and Operations Research group organized a series of seminars for graduate students on advanced and important topics/questions within Probability theory, Statistics and the theory of Random Processes. The topics considered were well outside the usual curricula of graduate courses. The intention of the series is to create "more air" and to expand the views of students on the field and on their possible topic of research.

MSCS hosted the inaugural New Zealand Energy Modelling Workshop#1 on 20 October 2004 with an emphasis on models with national policy relevance. This one-day event attracted 80 participants, equally split from academia, public research, industry, consulting, policy agencies, and the community. By all accounts, the last national scientific forum on energy modeling was held some 25 years ago (the May 1979 New Zealand Energy Conference).

The event website `http://www.mcs.vuw.ac.nz/events/EMW` contains the presentations and a list of participants. In addition, the central library will archive and catalog an edited version of that website for future reference.

Victoria computer enthusiasts were treated to an inside account of the software engineering and visual effects involved in the *Lord of the Rings* trilogy last week. Milton Ngan, the Digital Operations Manager from Weta Digital, gave a talk to Interface (the University's computer club) and SMSCS. The talk was on Software Engineering in the Visual Effects industry and focused on the work they did for the Lord of the Rings trilogy. Milton was an excellent speaker and provided some great insight, for Computer Science students, into working for an Oscar winning team.

A group of outstanding postgraduate students from New Zealand and overseas will be adding to Victoria University's research output in strategic areas next year. The results of the Vice-Chancellor's Strategic Research Scholarships, worth $20,000 each as well as a domestic fees waiver, have now been announced. Seven students, from New Zealand, Australia, Germany and the United States, will carry out research on subjects including international hunger relief, New Zealand's art collections, bioactive natural products and the psychology of new immigrants. One of the students, Will Smart, is an MSCS student, and one of only two VUW graduates to recieve this award.

Will Smart, who is soon to complete a Master of Science in Computer Science at Victoria, will undertake PhD research into using genetic computer programmes for vision and image recognition. Will's research will help a computer or robot 'see' a scene or person and perform simple tasks. His research could have many practical applications, including within the surveillance industry. He will be building a working robot as part of his research.

MSCS PhD student Silke Weinfurtner has been awarded a Hartle Prize from the International Society on General Relativity and Gravitation. These prizes were awarded to the best student presentations at the GR17 conference held in Dublin, Ireland in July. Silke gave a 20 minute talk titled *Massive d'Alembertian equation from a BEC-based analogue model* which is based on an article that will become part of her PhD project. Silke's PhD research is supervised by Dr. Matt Visser. The Hartle Award entitles Silke to three years' free membership to the International Society on General Relativity and Gravitation.

Marsden Fund grants: In the 2004 round only 6 awards were made in Mathematics and Information Sciences. Rod Downey gained a new grant for 3 years to work on Aspects of Computability and Randomness; Rod is also an Associate Investigator (AI) on Catherine McCartin's Fast Start project Online Model Theory and Online Algorithms. (Catherine is in the Institute of Information Sciences and Technology at Massey University and is a former PhD student of Rod's.) Emeritus Professor David Vere-Jones, under the auspices of Statistics Research Associates, was awarded a grant to study Hidden Markov Models for Earthquake Processes with Ancilliary Measurements.

Currently 7 staff in the School are Principal Investigators (PIs) on Marsden grants and a further 6 are AIs. Projects include work on models of gravitation, ownership types for object-oriented programming, matroid theory, local point processes in the neighbourhood of boundaries, noncommutative geometry, early sea ice growth in McMurdo Sound, and the theory of semi-structured data.

MSCS postgraduate students Alysha Nickerson and Pia Holland have been awarded Tuapapa Putaiao Maori Fellowships from the Foundation for Research, Science and Technology.

Pia Holland (Waikato Maniapoto, Ngai Tahu, Ngati Kahungunu ki Wairarapa) has just completed a BSc(Hons) degree and has received $20,000 for her MSc thesis in Computing Science. Pia's research is in the area of software engineering and focuses on visualisation of Object Oriented computer program designs. Alysha Nickerson (Ngati Porou) has also just completed a BSc(Hons) degree and has received $20,000 for a Masters thesis in Mathematics. Alysha will analyse the effects of solar heating on Sea Ice, particularly in the Antarctic region. Both students are mentors in Te Ropu Awhina Putaiao, the whanau support system for Maori and Pacific students in the Faculty of Science.

Next year we will host a two-day international workshop on Algebra and Geometry (**VIC 2005**). There will be a number of themes for the meeting including noncommutative geometry, quantum groups and representation theory. The meeting will help build cooperation and interaction between mathematicians in New Zealand and overseas. Dates and venue: 9–10 February 2005, Victoria University of Wellington. Organisers: Stefaan Caenepeel (—scaenepe@vub.ac.be), Rob Goldblatt (rob.goldblatt@mcs.vuw.ac.nz), Ginny Nikorima (ginnyn@mcs.vuw.ac.nz), Yinhuo Zhang (yinhuo.zhang@vuw.ac.nz). Website: `http://www.mcs.vuw.ac.nz/~mathmeet/vic2005/index.shtml`.

Promotions: Congratulations go to Shirley Pledger, promoted to Reader (alternative title to Associate Professor) in recognition of her significant work in ecological and conservation statistics. Congratulations also to Sharon Gao, Mengjie Zhang and Yinhuo Zhang, all promoted to senior lecturer. Meng's prolific and high quality research was recognised by an accelerated promotion to SL2. All three have strong and developing research profiles and contribute significantly to our teaching programmes and general good running of the School.

Matt Visser was awarded an accelerated promotion to AP4, and one of the University's awards for Research Excellence. Matt's outstanding research achievement since he got here has been matched by excellent teaching and a commitment to the wider dissemination of our understanding of the universe. Peter Andreae was promoted over the senior lecturer bar to SL7, in recognition particularly of his wider contribution to the university and excellent teaching. And our Head of School was promoted to SL7 for keeping us all in line for the last three years.

Seminars

Dr Yat-wah Wan (The Hong-Kong University of Science and Technology), "Storage space allocation in container terminals".

J F Harper, "Stagnant-cap bubbles with both diffusion and adsorption rate-determining".

Angela Martin, "When XP met outsourcing", and "The XP customer role in practice: three studies".

Magnus Bordewich (University of Canterbury), "Quantum computation, topology and approximate counting".

Ludmila Kozeratska (Computing Science, University of Alberta, Canada), "Ill-posed optimization problems and their regularization: research, industrial applications and teaching".

Professor François Coallier (Université du Québec), "International standardization in software and systems engineering and the global IT market".

Michael Norrish (NICTA, Canberra Research Lab), "Mechanising Hankin and Barendregt using the Gordon-Melham axioms".

Local News continued on page 24...

TRIBUTE FOR SIMON FITZPATRICK

Simon Fitzpatrick and Regina Burachik in January 2004. The Fitzpatrick function appears on the blackboard.

Simon Fitzpatrick worked in the mathematics department of The University of Auckland from 1982 to 1991. He was a senior lecturer in the School of Mathematics and Statistics at the University of Western Australia since 1991. Simon died of cancer on Saturday August 21, 2004. He has been a colleague and friend of people like myself from New Zealand, and others from around the world who work in Nonlinear and Convex Analysis, Monotone Operator Theory, Geometry of Banach Spaces, and Nonsmooth Analysis. He is missed by those who knew him. Because he is held in high esteem, two journals are putting out memorial issues for him. A memorial web page is at `https://www.maths.uwa.edu.au/People/fitzpatr/`. I am going to repeat a few paragraphs of my personal tribute to him from this site.

Simon has been a mate of mine since he joined the Auckland mathematics department in 1982. We started our collaboration by doing a paper on convex functions in non-reflexive Banach spaces, and another on accretive operators in Banach spaces. We then wrote a series of papers developing Ando's classic result on characterising Banach lattices with p-additive norms, using norm one linear projections onto sublattices. Some of our papers developed the Blaschke-Kakutani theory that characterises inner product spaces by the property that every two dimensional subspace is the range of a norm one linear projection.

In the 1990s Simon published a string of about ten papers with Jon Borwein. Some of the most influential were "Weak* sequential sompactness

and bornological limit derivatives", "Characterizations of Clarke subgradients among one-dimensional multifunctions", and "Examples of convex functions and classifications of normed spaces". His last work, with Regina Burachik, will form part of the Proceedings of the Session on Nonlinear Analysis and Optimisation from the conference VIC-2004.

I always found Simon good to work with. Simon was very intelligent, pleasant company, and energetic in his research work. He liked a game of bridge at lunchtime, and was good at it. He was an enthusiastic teacher, and at times we would talk together about our lecturing work. Once he ran a series of lectures, on convex functions, which I attended, and he lectured really well. Simon shared some of my interests in the University, and the wider society, and we attended some of the Association of University Staff meetings together. He played his part in departmental administration, and was concerned by our tolerance of low standards.

Simon and his wife Deborah were friendly folk, and they hosted the department at several evenings of board games. They enjoyed nature, and helped plant trees on Tiritiri Matangi, a small island which is being reforested. They left for Perth in 1991, when Simon took up his job at the University of Western Australia. At Simon's departmental farewell a lot of people were able to say how he had been valued, and would be missed, and I was pleased to be able to choose farewell presents for Simon and Deborah. In later years we corresponded, and I was impressed by how well Simon handled Deborah's bad health, and his own.

Bruce Calvert
The University of Auckland

Local News continued...

Sebastian Link (Massey, Palmerston North), "Database design in the presence of lists".

Alex Potanin, "Defaulting Java to ownership".

Daryl Daley (The Australian National University), "Classical k-server queues revisited: some problems".

David Vere-Jones, "Self-similarity for marked point processes: developing a self-similar version of the ETAS earthquake model".

Annika Hinze (The University of Waikato), "Context-aware information delivery using event notification".

John A Randal, "A reinvestigation of robust scale estimation in finite samples".

Carl Scarrott (University of Canterbury), "Spectrum estimation for nuclear reactor control and risk assessment".

Moon-ho Ringo Ho (McGill University), "State-space approach to modelling brain dynamics from fMRI data".

Neil Dodgson (Computer Laboratory, University of Cambridge), "Where mathematics and art meet: improving the tools for Computer Aided Design".

Professor John Cleary (The University of Waikato) "Starlog - a stratified logic programming language".

Dr Kit Withers (Applied Maths Group, Industrial Research Ltd), "Nonparametric confidence intervals based on weighted empirical distributions".

Rod Downey, "Degrees computable from 1-generic degrees".

Liang Yu, "WWKL_0 and reverse mathematics".

Stellan Ohlsson (University of Illinois at Chicago), "Psychological theory and the design of computer-based instruction: the case of constraint-based student modeling".

James Sneyd (The University of Auckland), "Mathematical modeling of calcium dynamics".

Stephen Marsland (Massey University), "Diffeomorphic image warping and the non-rigid registration of medical images".

Eric Zaslow (Northwestern University), "Introduction to duality in quantum field theory".

Bruce Richter (University of Waterloo, Canada, NZMS visiting speaker), "A simple proof of Grotzsch's Theorem".

Frank Critchley (Open University, UK), "Skewness a la mode?"

Estate V Khmaladze, "Directional derivatives of sets: how to do it and why is it useful for statistics".

Eric Zaslow (Northwestern University), "Doughnuts and T".

Benjamin Atkin, "Network aware adaptation in mobile filesystems".

Milton Ngan (Weta Digital), "Software engineering in the VFX industry".

Graham Farr (Monash University), "On the symmetric Ashkin-Teller model and Tutte-Whitney functions".

Estate V Khmaladze "Differentiation of set-valued mappings; comparisons and further problems".

Veronica Becher (University of Buenos Aires), "Randomness in $(\text{emptyset})^n$, in the spirit of Rice's theorem for computability".

Matt Jones (Computer Science, The University of Waikato), "An evaluation of techniques for browsing photograph collections on small displays".

Rick Mugridge (The University of Auckland), "Getting fit: driving development through customer tests".

Gordon Royle (University of Western Australia), "The Brown-Colbourn property for matroids".

Ben Bederson, "Interfaces for staying in the flow".

Tobias Wittmann (Technical University of Berlin), "Modeling the uptake of distributed energy solutions under market deregulation and mandatory greenhouse gas constraints".

Mark McGuiness (live feed from South Korea)

FEATURES

THE FIRST THIRTY YEARS OF THE NZMS—Officers and Council

Year	President	Vice-President	Secretary	Treasurer	Council
1974/5	David Vere-Jones	John Butcher, Walter Davidson	Graeme Wake	Peter Lorimer	Jim Ansell, Kevin Broughan, Wilf Malcolm, Gordon Petersen.
1975/6	John Butcher	Gordon Petersen, David Vere-Jones	Kevin Broughan	Peter Lorimer	Robert Davies, Wilf Malcolm, Desmond Sawyer.
1976/7	Gordon Petersen	John Butcher,	Brent Wilson	Ivan Reilly	Kevin Broughan, Robert Davies, Wilf Malcolm, Desmond Sawyer, Brian Woods.
1977/8	Gordon Petersen	Graeme Wake	Brent Wilson	Ivan Reilly	Kevin Broughan, Robert Davies, Desmond Sawyer, John Turner.
1978/9	Graeme Wake	Gordon Petersen, John Turner	Stan Roberts	Ivan Reilly	Kevin Broughan, Doug Harvie, Gillian Thornley, Brent Wilson.
1979/80	John Turner	Donald Joyce, Graeme Wake	Mark Schroder	Stan Roberts	Doug Harvie, Bob Long, Gloria Olive, Gillian Thornley.
1980/1	Dean Halford	David Gauld, John Turner	Gillian Thornley	Stan Roberts	Jim Ansell, Michael Carter, Doug Harvie, Bob Long, Gloria Olive.
1981/2	David Gauld	Jim Ansell, Dean Halford	David Smith	Joel Schiff	Michael Carter, Bob Long, Alex McNabb, Gloria Olive.
1982/3	Jim Ansell	Walter Davidson, David Gauld	Ken Russell	Joel Schiff	Michael Carter, Ian Coope, Peter Hill, Alex McNabb, David Smith.
1983/4	Walter Davidson	Jim Ansell, Michael Carter	John Shanks	Joel Schiff	Ian Coope, Peter Hill, Alex McNabb, John Shanks, David Smith.
1984/5	Michael Carter	Walter Davidson, Ivan Reilly	Charles Little	John Shanks	Peter Hill, John Harper, Murray Jorgensen, Ernie Kalnins.
1985/6	Ivan Reilly	Michael Carter	Marston Conder	John Shanks	John Harper, Murray Jorgensen, Ernie Kalnins, Charles Little, Brent Wilson.
1986/7	Ivan Reilly	Brian Woods	Marston Conder	John Shanks	John Harper, Murray Jorgensen, Ernie Kalnins, Gillian Thornley, Brent Wilson.
1987/8	Brian Woods	Ingrid Melchert (as Rinsma)	Derrick Breach	John Shanks	Marston Conder, David Gauld, Rob Goldblatt, Alfred Sneyd, Gillian Thornley, Chris Triggs, Brent Wilson.
1988/9	Brian Woods	Gillian Thornley	Derrick Breach	John Shanks	John Butcher, Marston Conder, Rob Goldblatt, Alfred Sneyd, Chris Triggs.
1989/90	Gillian Thornley	Brian Woods	John Giffin	Kee Teo	John Butcher, Marston Conder, Rob Goldblatt, Alfred Sneyd, Chris Triggs.
1990/1	Gillian Thornley	Derek Holton	John Giffin	Kee Teo	John Butcher, Marston Conder, Rob Goldblatt, Ingrid Melchert (as Rinsma), David Robinson.

1991/2	Derek Holton	Gillian Thornley	Robert Aldred	Kee Teo	Rob Goldblatt, Ingrid Melchert (as Rinsma), Margaret Morton, David Robinson, Graham Weir.
1992/3	Derek Holton	Marston Conder	Robert Aldred	Kee Teo	Robert Chan, Rob Goldblatt, Mike Hendy, David Robinson, Ingrid Melchert, Margaret Morton, Graham Weir.
1993/4	Marston Conder	Derek Holton	Margaret Morton	Kee Teo	Rick Beatson, Robert Chan, Mike Hendy, Ernie Kalnins, Mark McGuinness, Margaret Morton, Graham Weir.
1994/5	Marston Conder	Douglas Bridges	Margaret Morton	Mark McGuinness	Rick Beatson, Robert Chan, Mike Hendy, Ernie Kalnins, Dennis McCaughan, Mark McGuinness, Mick Roberts.
1995/6	Douglas Bridges	Marston Conder	Stephen Joe	Mark McGuinness	Rick Beatson, Mike Hendy, Ernie Kalnins, Dennis McCaughan, Mark McGuinness, Mick Roberts.
1996/7	Douglas Bridges	Rob Goldblatt	Stephen Joe	Mark McGuinness	Rick Beatson, Michael Hendy, Vivien Kirk, Dennis McCaughan, Robert McLachlan, Mick Roberts
1997/8	Rob Goldblatt	Douglas Bridges	Stephen Joe	Mick Roberts	Rick Beatson, Mike Hendy, Vivien Kirk, Dennis McCaughan, Robert McLachlan.
1998/9	Rob Goldblatt	Graeme Wake	Stephen Joe	Mick Roberts	Rick Beatson, Douglas Bridges, Mike Hendy, Vivien Kirk, Dennis McCaughan, Robert McLachlan
1999/ 2000	Graeme Wake	Rob Goldblatt	Charles Semple	Mick Roberts	Bill Barton, Douglas Bridges, Stephen Joe, Dennis McCaughan, Robert McLachlan, Charles Semple.
2000/1	Graeme Wake	Rod Downey	Charles Semple	Rua Murray	Bill Barton, Douglas Bridges, Peter Fenton, Stephen Joe, Robert McLachlan.
2001/2	Rod Downey	Graeme Wake	Shaun Hendy	Rua Murray	Peter Fenton, Geoff Whittle.
2002/3	Rod Downey	Mick Roberts	Shaun Hendy	Rua Murray	Peter Fenton, Gaven Martin, Charles Semple, Tammy Smith, Geoff Whittle.
2003/4	Mick Roberts	Rod Downey	Shaun Hendy	Tammy Smith	Michael Albert, Gaven Martin, Warren Moors, Charles Semple, Geoff Whittle.

APPLIED AND INDUSTRIAL MATHEMATICS IN KOREA

In 2002, Professor Graeme Wake (pictured), from the Centre for Mathematics in Industry within the Institute of Information and Mathematics Sciences on Massey's Albany Campus, was invited to form and lead an International team to foster the development in Industrial and Applied Mathematics at the Korean Advanced Institute for Science and Technology (KAIST) in Daejeon, South Korea. The team of four consists of two New Zealanders (Mark McGuinness, VUW and Graeme), a Canadian, and an Australian.

In rotation they have provided postgraduate courses in mathematical modelling and led initiatives focussed towards the eventual scheduling of Mathematics-in-Industry Study Groups to provide a forum for industrial problem-solving. The first was in July 2003, and was supported in part by the RSNZ under their international linkages program. The second in this series was held late in August 2004 and details are on `http://amath.kaist.ac.kr/imi`.

Graeme has just returned from a second of three month-long visits to Daejeon. He reports:

"Daejeon is about 200kms south of Seoul, and is home to KAIST which is on-track to become a MIT of North Asia. There is a heavy involvement of scientific research in the area and a bias towards postgraduate student research. Our visiting team provides postgraduate courses in block mode. My host department (the newly formed Division of Applied Mathematics at KAIST) has a goal of being the leader in the country, with a push towards Applications of Mathematics, unlike their fore-runners which were akin to Mathematics Departments in North America in the 1960–70's, with little applications-focussed mathematics."

"The students are selected from all over the country (48 million people) and occasionally from neighbouring countries (I had one from Mongolia this year) with intense competition for entry. Our visiting team is housed on campus in an international village and enjoys the cultural immersion in a finely-tuned and very different society."

"In turn, students and faculty from Korea have participated in our Mathematics-in-Industry Study Group here in New Zealand, such as that which will be hosted at Albany in January. See `http://misg2005.massey.ac.nz`."

During this last visit in August 2004, Graeme linked up with the NZ Ministerial team in Science and Technology led by Hon Peter Hodgson which visited Korea, along with China and Japan. Programs such as ours are to be fostered under the Ministry's auspices, and are seen as pioneers in the region for the New Zealand–Korea co-operation in Science. He also was an invited speaker at the bi-annual Korean Applied Mathematics Forum, and a Mathematical Biology workshop in Gyeongju, in the southern part of the Korean peninsula.

The team program which Graeme leads is now in the final year of operation. There is a willingness to extend this sort of activity in Industrial and Applied Mathematics beyond its present schedule, which finishes in 2005.

A similar initiative is beginning in Thailand. Professor Robert McKibbin, Head of the Institute of Information and Mathematical Sciences at Massey, visited in May and Professor Graeme Wake is following up with a week long visit to Bangkok in October. It is expected Massey's Centre for Mathematics-in-Industry will be heavily involved as this initiative develops.

Contact `g.c.wake@massey.ac.nz`.

22nd September 2004

BOOK REVIEWS

[David Alcorn was first listed as Book Reviews Editor in Newsletter #43 of August 1988. After 49 issues and more than 16 years, he is now hanging up his cap as he retires from Auckland University. I thank David for his tireless dedication to the Newsletter, managing what is perhaps its most substantial component, and also wish a warm welcome to Bruce van Brunt who is now taking on the job. It is also a pleasure to acknowledge the support of Birkhäuser who, along with Springer, are now offering us books for review. On behalf of Bruce I would encourage any readers to try their hand at a review. – Editor]

SPRINGER-VERLAG PUBLICATIONS

Information has been received about the following publications. Anyone interested in reviewing any of these books should contact

Bruce van Brunt
Institute of Fundamental Sciences
Massey University
(email: B.vanBrunt@massey.ac.nz)

Arnold, VI, Arnold's Problems. 639pp.

Berggren, L Pi: A Source Book. 797pp.

Bonatti, C Dynamics Beyond Uniform Hyperbolicity—A Global Geometric and Probabilistic Perspective. (Encyclopaedia of Mathematical Sciences, 102) 384pp.

Bourbaki, N, Elements of Mathematics—Integration II, Chapters 7–9. 326pp.

Bronstein, M, Symbolic Integration I. (Algorithms, Computation Mathematics, 1) 325pp.

Buchmann, J, Introduction to Cryptography. (Undergraduate Texts in Mathematics) 275pp.

Bump, D, Lie Groups. (Graduate Texts in Mathematics, 225) 410pp.

Burger, E, Making Transcendence Transparent. 263pp.

Capinski, M, Measure, Integral and Probability. (Springer Undergraduate Mathematics) 311pp.

Creutzig, C, MuPAD Tutorial. 430pp.

Edmunds, DE, Hardy Operators, Function Spaces and Embeddings. (Springer Monographs in Mathematics) 326pp.

Ern, A, Theory and Practice of Finite Elements. (Applied Mathematical Sciences, 159) 524pp.

Gallot, S, Riemannian Geometry. (Universitext) 322pp.

Georgiadou, M, Constantin Carathéodory—Mathematics and Politics in Turbulent Times. 651pp.

Guy, RK, Unsolved Problems in Number Theory. (Problem Books Mathematics) 437pp.

Hida, H, p-Adic Automorphic Forms on Shimura Varieties. (Springer Monographs in Mathematics) 390pp.

Hoffman, J, Dreams of Calculus—Perspectives on Mathematics Education. 158pp.

Huybrechts, D, Complex Geometry. (Universitext) 301pp.

Kanovei, V, Nonstandard Analysis, Axiomatically. (Springer Monographs in Mathematics) 408pp.

Kasana, HS, Introductory Operations Research—Theory and Applications. 581pp.

Kuznetsov, YA, Elements of Applied Bifurcation Theory. (Applied Mathematical Sciences, 112) 631pp.

Lazarsfeld, RK, Positivity in Algebraic Geometry I—Classical Setting: Line Bundles and Linear Series. 387pp.

Lazarsfeld, RK, Positivity in Algebraic Geometry II—Positivity for Vector Bundles, and Multiplier Ideals. 385pp.

Libkin, L, Elements of Finite Model Theory. (Texts in Theoretical Computer Science). 315pp.

Logan, JD, Applied Partial Differential Equations. (Undergraduate Texts in Mathematics). 209pp.

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Mumford, D, Selected Papers—On the Classification of Varieties and Moduli Spaces. 795pp.

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Nazareth, JL, An Optimization Primer—On Models, Algorithms, and Duality. 108pp.

Prasolov, VV, Polynomials. (Algorithms Computation Mathematics, 11) 301pp.

Roman, S, Introduction to the Mathematics of Finance—From Risk Management to Options Pricing. (Undergraduate Texts in Mathematics) 354pp.

Ross, CC, Differential Equations—An Introduction with Mathematica®. (Undergraduate Texts in Mathematics). 431pp.

Shackell, JR, Symbolic Asymptotics. (Algorithms, Computation Mathematics, 12) 243pp.

Solodov, A, Differential Models. 232pp.

Varga, RS, Geršgorin and His Circles. (Springer Series in Computational Mathematics, 36) 226pp.

Wallis, J, The Arithmetic of Infinitesimals. (Sources, Studies History Mathematics) 192pp.

LIMIT THEOREMS FOR STOCHASTIC PROCESSES

2nd ed, by Jean Jacod and Albert S. Shirayev, Grundlehren der mathematischen Wissenschaften, 288, Springer-Verlag, Berlin, 2003,
661pp, EUR 119.95.95. ISBN 3-540-43932-3.

This is the second edition of a well-known reference work on the theory of weak convergence of probability measures on metric spaces and more precisely the theory of convergence in law for those stochastic processes that are semimartingales. The original (1987) edition has been updated by the inclusion of sections relating to financial mathematics and to stability results for stochastic differential equations relating to predictable uniform tightness.

Weak convergence is the study of convergence in law, for example convergence of the standardised mean to the normal. Thus it gives a first approximation that allows one to estimate percentiles. More generally convergence of a random function to another random function, say $X_n \to X$, allows one to conclude convergence of a functional of that random function, say $f(X_n) \to f(X)$, eg $f(X) = \sup|X(t)|$.

Let me begin by contrasting the book under review with the readable and compelling standard text on weak convergence, Billingsley, P. (1968) Convergence of probability measures, Wiley, New York.

Both books study weak convergence of random functions, say $X_n \to X$ as $n \to \infty$.

Billingsley uses Prokhorov's method:
(i) prove X_n is tight
(ii) prove $\{X_n(t_1), ..., X_n(t_1)\}$ converges in law to $\{X(t_1), ..., X(t_1)\}$
(iii) characterise X by its finite dimensional distributions.

In their massive and detailed work Jacod and Shiryaev provide alternative routes, giving the theory for semi-martingales. This is a very rich book and certainly not one for the faint hearted. In fact it's one of the most difficult I have ever read. Nor is it one where you can pick out the theorem you want and forget the rest: you must search out the definitions of the terminology and the conditions used. And this leads to a backward trawl through the book.

A semi-martingale is right-continuous with a left-hand limit. It is characterised by a drift term, the variance of its Gaussian part, and its Levy measure. They are right-continuous with left limits. So weak convergence is in the Skorokhod space D endowed with a complete separable topology.

The difficulty of proceeding via (ii) has led to other methods, eg Skorokhod's embedding theorem and Borovkov's methods. This book expounds the martingale method begun by Stroock and Varadhan:
(i) prove X_n is tight (see Chapter 6)
(ii)$'$ prove convergence of triplets of characteristics
(iii)$'$ characterise X by the triplet of characteristics.

Here (iii)′ is the difficult step: Chapter 3 is largely devoted to outlining this problem and providing some partial answers.

The first two chapters provide a fairly complete account of semimartingale theory. The limit theorems themselves are presented in Chapters 7-9 while Chapter 10 studies convergence of the likelihood ratio processes to normality and convergence under contiguous alternatives using the Hellinger processes and integrals of Chapters 4-5.

The book concludes with an index of topics and an index of conditions for limit theorems. For example the first limit theorem indexed is for μ_n, μ infinitely divisible distributions on $\mathbb{R}^d$ with characteristics (b_n, c_n, F_n) and (b, c, F). (For infinitely divisible distributions on $\mathbb{R}$ see Feller.)

The chapter headings are as follows:

Chapter I. The General Theory of Stochastic Processes, Semimartingales and Stochastic Integrals

Chapter II. Characteristics of Semimartingales and Processes with Independent Increments

Chapter III. Martingale Problems and Changes of Measures

Chapter lV Hellinger Processes, Absolute Continuity and Singularity of Measures

Chapter V. Contiguity, Entire Separation, Convergence in Variation

Chapter VI. Skorokhod Topology and Convergence of Processes

Chapter VII. Convergence of Processes with Independent Increments

Chapter VIII. Convergence to a Process with Independent Increments

Chapter IX. Convergence to a Semimartingale

Chapter X. Limit Theorems, Density Processes and Contiguity

Kit Withers
Industrial Research Limited
Lower Hutt

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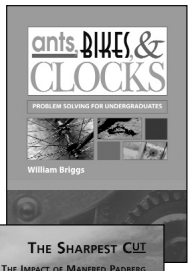

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Edited by Martin Grötschel

MPS-SIAM Series on Optimization 4

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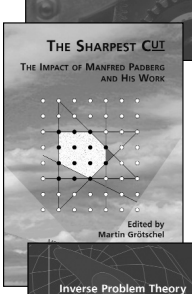

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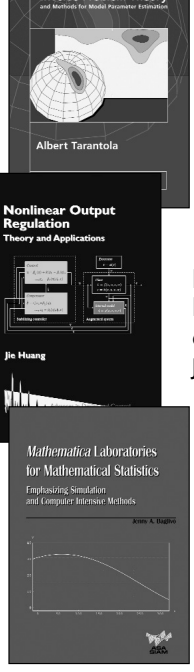

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Here is a comprehensive and in-depth treatment of one of the most important control problems: the nonlinear output regulation problem. This book contains up-to-date research results and algorithms and tools for approaching and solving the output regulation problem and other related problems, such as robust stabilization of nonlinear systems. The author also offers personal insights about solving the output regulation problem.

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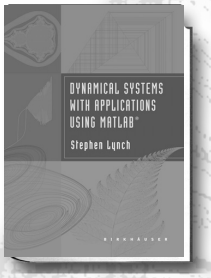

Lynch, S., Manchester Metropolitan University, United Kingdom

Dynamical Systems with Applications using MATLAB®

2004. 480 pages. Softcover
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ISBN 0-8176-4321-4

Covers standard material for an introduction to dynamical systems theory. Readers are guided through theory via example, and the graphical MATLAB® interface. The SIMULINK® accessory is used to simulate real-world dynamical processes. Examples from: mechanics, electric circuits, economics, population dynamics, epidemiology, nonlinear optics, materials science, and neural networks. Over 330 illustrations, 300 examples, and exercises with solutions. Aimed at senior undergraduates, graduate students, and working scientists in various branches of engineering, applied mathematics, and the natural sciences.

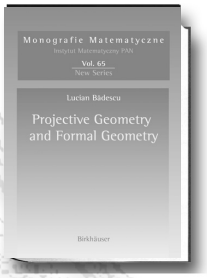
Graf, U., School of Engineering and Architecture, Bienne, Switzerland

Applied Laplace Transforms and z-Transforms for Scientists and Engineers

A Computational Approach using a Mathematica Package

2004. 510 pages. Hardcover, incl. CD-ROM
€ 88.–
ISBN 3-7643-2427-9

This book presents theory and applications of Laplace and z-transforms together with a Mathematica package developed by the author. The package substantially enhances the built-in facilities of Mathematica. The emphasis lies on the computational and applied side, particularly in the fields of control engineering, electrical engineering, and mechanics. Many worked out examples from engineering and sciences illustrate the applicability of the theory and the usage of the package. Students, instructors, practical engineers and researchers working in the field of control, electricity or mechanics will find this textbook a most valuable resource and will profit from the package and further examples and Mathematica notebooks on the included CD-ROM.

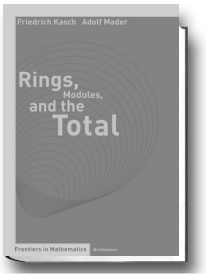


Bădescu, L., University of Genova, Italy

Projective Geometry and Formal Geometry

2004. 218 pages. Hardcover
€ 72.–
ISBN 3-7643-7123-4
MMN - Monografie Matematyczne, New Series, Vol. 65

The aim of this monograph is to introduce the reader to modern methods of projective geometry involving certain techniques of formal geometry. Some of these methods are illustrated in the first part through the proofs of a number of results of a rather classical flavor. Motivated by the first part, in the second formal functions on the formal completion X/Y of X along a closed subvariety Y are studied, particularly the extension problem of formal functions to rational functions. The book contains a lot of results obtained over the last thirty years, many of which never appeared in a monograph or textbook. It addresses to algebraic geometers as well as to those interested in using methods of algebraic geometry.



Kasch, F., Universität München, Germany / **Mader, A.**, University of Hawaii, Honolulu, USA

Rings, Moduls, and the Total

2004. 146 pages. Softcover
€ 38.–
ISBN 3-7643-7125-0
FM - Frontiers in Mathematics

In a nutshell, this monograph deals with direct decompositions of modules and associated concepts. The central notion of "partially invertible homomorphisms", namely those that are factors of a non-zero idempotent, is introduced in a very accessible fashion. Units and regular elements are partially invertible. The "total" consists of all elements that are not partially invertible. It contains the radical and the singular and cosingular submodules, but while the total is closed under right and left multiplication, it may not be closed under addition. Cases are discussed where the total is additively closed. The total is particularly suited to deal with the endomorphism ring of a direct sum of modules that all have local endomorphism rings and is applied in this case. Further applications are given for torsion-free Abelian groups.

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CONFERENCES

KERR FEST—BLACK HOLES COME OF AGE

In August around 60 mathematicians, physicists and astronomers from around the world gathered in Christchurch to celebrate the unique solution of Einstein's equations given to us by Emeritus Professor Roy Kerr, this being the year of Roy's 70th birthday. Roy is well known to those in the mathematics community as a former Head of Canterbury's Department of Mathematics and Statistics, and many locals will recall his contributions to the department, or his exploits respresenting New Zealand in bridge. But scientifically the name Kerr means one thing: black holes, and over the past seven years the evidence for Kerr black holes has increased dramatically as many new observations from X-ray satellites have radically changed our understanding of the role of black holes as central to the life of the universe.

The Kerr solution is by now a "household name" among astrophysicists. As Andy Fabian, head of the X-ray astronomy group at the University of Cambridge remarked at the meeting: "for the past ten years I've been living in the Kerr geometry". Fabian, who has worked on almost every X-ray satellite, including NASA's Chandra mission, was head of a team that in 1997 produced the first hard evidence that black holes are indeed rotating.

Since black holes are surfaces in space – so-called event horizons – from which nothing, not even light, can escape they are naturally very difficult to observe. However, black holes can be detected by their influence on nearby luminous stars and gas. A black hole in a binary system will often suck matter off its partner star, forming a spinning accretion disk, in which particles accelerated to very high speeds emit X-rays before finally being swallowed by the black hole. By carefully examining the redshifts and intensities of these X-ray spectra Fabian's team has shown that the black holes have to be spinning: the redshifts are so great that this is the only possibility the equations allow.

The most recent evidence has come from the black hole in the centre of our own galaxy, which has a mass a few million times that of the sun. In a paper published in Nature in October 2003, a team of astronomers led by Reinhard Genzel showed from the 17 minute period of infrared flares from matter falling into the black hole that it must be spinning at about half the maximum rate allowed by the Kerr solution. Fulvio Melia, of the University of Arizona who presented the Public Lecture, showed a capacity audience in the university's largest lecture theatre stunning images of our galactic black hole and a movie of stars orbiting nearby which has been filmed over the past decade.

Yet 41 years ago when Roy first presented his solution, there was a strong school of thought that black holes could not exist. The word "black hole" was not even used until the late 1960s, reflecting the paradigm shift resulting from Kerr's revolution. In 1963 black holes were known as "frozen stars" or "gravitationally collapsed objects", and were thought to be of theoretical interest only. The only exact solution known, that found by Karl Schwarzschild a few weeks after Albert Einstein published his field

equations of general relativity in 1915, described non-rotating stars and black holes. All compact objects in the universe rotate, and so until 1963 there were many who believed that the perturbations introduced by rotation would prevent black hole event horizons ever forming. Roy's dramatic discovery showed that this was not the case, and since rotating solutions with event horizons existed, black holes had to be taken very seriously as actual physical objects of the universe.

As with many major leaps in science, acceptance of the reality of astrophysical black holes was not immediate. It is ironic that the first observations of then mysterious quasars were discussed at the very same Texas symposium in 1963 where Roy first presented his results to a generally unreceptive audience. As the Kerr solution was explored further it came to be realised that supermassive Kerr black holes can explain the engines that power quasars in the centres of active galaxies.

Without rotation gravity "sucks" leading to rather boring physical phenomena. With rotation black hole physics becomes very dynamic. Rotating bodies literally drag space with them. Near the Earth the effect is tiny, but nonetheless is something we hope to measure soon with the Gravity Probe B satellite just launched in April. Near a Kerr black hole frame dragging reaches dramatic proportions. Head on what you think is a straight line towards a Kerr black hole and the sky will start spinning even when you are sober! The most energetic phenomena in the universe – not only quasar jets but also the huge energies of gamma ray bursts from the most violent supernovae explosions – are believed to arise from the mining of the spin energy of rotating black holes. The calculations to understand these phenomena are only possible with the Kerr solution.

The Kerr solution will become ever more important in the next two decades when we start to detect the gravitational waves – ripples in the fabric of space – that arise when two massive objects such as black holes collide, probing strong field regimes of gravity which remain a mystery at present. The huge (3–4 km long) laser interferometers LIGO, VIRGO, GEO and TAMA, which have commenced operation around the world will provide the first detections in the next few years if we are lucky. The LISA triple satellite mission, a triangular laser interferometer with baselines of 5 million kilometres, will open up a new field of gravitational wave astronomy a decade from now, in which many remaining mysteries of black holes will be teased out.

At the Kerr Fest we heard about these future prospects from the experts involved in these projects, such as Maurice van Putten of MIT, as well as hearing lectures from some of the legendary characters in the history of black holes, such as Brandon Carter, who perhaps did more than anyone to explore the properties of the Kerr geometry, and David Robinson (another Kiwi) who completed the theorems that showed the Kerr solution is the unique rotating black hole solution of Einstein's equations. The presentations at the meeting ranged over mathematical studies of the Kerr geometry, astrophysics of rotating black holes, and the theoretical ideas surrounding rotating black holes at the frontiers of research in quantum gravity.

All in all the conference was a splendid success. The financial support of the NZIMA, the MacDiarmid Institute, the Marsden Fund and the University of Canterbury Department of Mathematics and Statistics is gratefully acknowledged. A special commemorative volume based on the plenary lectures is due to be published in 2005 by Cambridge University Press. The conference has also rekindled Roy's own interest in the gravitational two-body problem, something which he looked at in his PhD thesis in Cambridge before he found his solution, and which is at present of immense topical interest for understanding the signals to be seen by gravitational wave detectors. Roy is now an active member of the relativity and gravitation group at Canterbury, and next year he will be taking up a position at the University of Arizona.

The crowning highlight at the Kerr Fest was the announcement by Remo Ruffini that Roy will receive the Grossmann Award at the next Marcel Grossmann Meeting in St Petersburg in 2006. In place of a medal recipients (in the past including Stephen Hawking and Roger Penrose) receive the TEST sculpture, which fittingly enough is a representation, cast in silver, of particle motion in the vicinity of a Kerr black hole.

Dr David Wiltshire
Department of Physics and Astronomy, University of Canterbury

A number of presentations and other materials from the Kerr Fest are available online at `http://www2.phys.canterbury.ac.nz/kerrfest/`.

REPORT ON DYNAMICAL SYSTEMS AND NUMERICAL ANALYSIS MEETING

A few eyebrows were raised in the hibernating town of Raglan on 30 August 2004 when a bus full of mathematicians arrived to town. I was one of 55 people attending a workshop on dynamical systems and numerical analysis, sponsored by NZIMA (New Zealand Institute of Mathematics & its Applications). The workshop was held at a newly built local motel (anyone in Raglan could tell you the exact location) and we surely made an impact on the town. So much so that a journalist was sent to cover the event in the local newspaper (though it is not clear that an article was ever published).

Each day of the 5 day workshop we had a keynote speaker who gave two one-hour talks. The highlight for me was the talks by Professor Andrew Stuart from The University of Warwick who spoke about "Dimension reduction and stochastic dynamics". Professor Stuart described a few algorithms to extract a macroscopic representation from a microscopic behaviour (both dynamics could be either deterministic or stochastic). The examples included explicit time-scale separation and mean time-scale separation.

Professor Alan Champneys from the University of Bristol spoke about "Bumps, blips and bulges: the theory of localization". The first hour was devoted to homoclinic and heteroclinic bifurcation theory and the second hour was devoted to "localised solutions to PDEs". PDEs were the main focus of the talks by Professor Edgar Knobloch from the University of Leeds who described in detail two examples. The first example involved "Bursts in fluid dynamics: a finite-dimensional mechanism" and the second example "Nearly inviscid Faraday waves: relaxation oscillations and canards" described the dynamics of fluid in a distorted cylinder.

Professor Arieh Iserles from Cambridge University talked about "Lie group methods" and managed to keep us awake despite the difficult slot he got (the last talk on the first day) by describing methods that guarantee the existence of numerical solutions on manifolds. I found the talks by Dr Jeroen Lamb from Imperial College harder to follow. The title of his first talk was "Bifurcation in coupled cell networks: designer dynamics?" and of the second talk: "Reversible Hopf-zero bifurcation and the Kuramoto-Sivashinsky PDE".

26 people gave contributed talks of 15 min each. The talks covered a wide range of subjects such as new numerical methods for solving differential equations, theoretical results in dynamical systems, mathematical modeling of bees' house hunting and mathematical modeling of cool flame oscillations. A full list of titles can be found at: `http://www.math.waikato.ac.nz/~rua/dsna/raglan/index.html`.

The weather was nice except when we had a free afternoon. This however did not stop a group of people from climbing Mt. Karioi (they came back soaked but happy) while others went on a boat tour or enjoyed the cozy rooms. The workshop was perfectly organized (by Vivien Kirk, Mark McGuinness, Robert McLachlan, Rua Murray, Reinout Quispel and Margaret Woolgrove) and this contributed to a superb atmosphere.

More details on the meeting including some downnloadable files and some photos can be found at: `http://www.math.waikato.ac.nz/~rua/dsna/raglanmeeting.html`.

Alona Ben-Tal
Bioengineering Institute
The University of Auckland

7TH AUSTRALASIAN MATHEMATICS AND COMPUTERS IN SPROT CONFERENCE

This Conference was successfully held at the Institute of Rugby on the Palmerston North campus of Massey University, New Zealand, between 29 August and 2 September 2004. The Conference was organised by Associate Professor R Hugh Morton of the Institute of Food, Nutrition and Human Health. Thirty four delegates, including six students, attended from New Zealand, Australia, the UK and USA. A splendid Conference Dinner was held at "Ambitions", the instructional restaurant of the local catering school.

The keynote speakers were Professor Mike Hughes, from the Centre for Performance Analysis at the University of Wales Institute Cardiff, UK, and Professor Keith Davids, of the School of Physical

Education, Otago University, Dunedin, New Zealand. Professor Hughes spoke on "Notational Analysis—a Mathematical Perspective" and Professor Davids on "Variability and Constraints in Dynamical Movement Systems."

The refereed Conference Proceedings have been published by Massey University, (R Hugh Morton & S Ganesalingam, Eds, ISBN 0-476-00833-6) and are available from the Editors at NZ$35. Some details of the Conference, including the programme of presentations, can still be found on the web at `http://7mcs.massey.ac.nz`. As well as covering general sports related themes, papers included applications in tennis, rugby, cricket, basketball, handball, water polo, football and mountain biking.

The 8th MathSport Conference (as they have become known) is scheduled for July 2006, at the Tweed Heads campus of Southern Cross University, Australia; contact Dr J Hammond (`jhammond@scu.edu.au`) for further details.

Associate Professor R Hugh Morton, PhD
Email: `H.Morton@massey.ac.nz`

Conferences in 2005

8–15 January 2005 (Napier) **11th NZMRI Summer Meeting on Geometry: Interactions with Algebra and Analysis**
website: `http://www.math.auckland.ac.nz/Conferences/2005/geometry-program/nzmri.html`

24–28 January 2005 (Massey University at Albany, Auckland) **Mathematics-in-Industry Study Group 2005**
website: `http://misg2005.massey.ac.nz`
Please register your interest and accommodation requirements as soon as possible.
ANZIAM'S Annual Conference is the following week in Napier, New Zealand, six hours comfortable drive from Auckland.

30 January–3 February 2005 (Napier) **Annual meeting of ANZIAM (Australian and New Zealand Industrial and Applied Mathematics)**
website: `http://www.anziam.org.au/nzbranch.html`

8–11 February 2005 (The University of Auckland, Auckland) **Approximation Theory and Harmonic Analysis**
website: `http://www.math.auckland.ac.nz/Conferences/NZATG-2-2005/`

9–10 February 2005 (Victoria University of Wellington) **International Workshop on Algebra and Geometry**
website: `http://www.mcs.vuw.ac.nz/~mathmeet/ vic2005/index.shtml.`

14–18 February 2005 (Auckland) **International Meeting on Geometry: Interactions with Algebra and Analysis**
website: `http://www.math.auckland.ac.nz/Conferences/2005/geometry-program/auckland.html`

APPROXIMATION AND HARMONIC ANALYSIS
8–11 February 2005,
The University of Auckland, Auckland, New Zealand

This is the third meeting organised by the New Zealand Approximation Theory Group (following those in Christchurch 1999 and Westport 2002). The topic Approximation and Harmonic Analysis will be interpreted broadly. We plan to allocate lots of time without lectures for informal interactions, including a conference trip to a Gulf Island (probably Waiheke). Currently confirmed speakers include:

John Benedetto (Maryland), Carl de Boor (Wisconsin), Len Bos (Calgary), Pete Casazza (Missouri), Xuan Duong (Sydney), Seng Luan Lee (Singapore), David Levin (Tel Aviv), Detlef Mache (Bochum), Vilmos Totik (S. Florida/Szeged).

Accommodation
We expect most participants to stay at either O'Rourke Hall ($NZ 59 night incl breakfast) or Quest on Mount apartments ($NZ 118 studio, $135 one room, $180 two rooms) which are located by the University (in the downtown area).

Registration
For now, expressions of interest can be made by writing to `conf2005@math.canterbury.ac.nz`. Later an electronic registration will be set up. The registration fee is yet to be set but will be less than $150NZ.

Organising committee

- Rick Beatson (University of Canterbury)
- Qui Bui (University of Canterbury)
- Shayne Waldron (The University of Auckland)

`http://www.math.auckland.ac.nz/Conferences/NZATG-2-2005`

ANZIAM 2005
The annual ANZIAM Applied Mathematics Conference
January 30 - February 3, 2005
War Memorial Conference Centre, Napier, New Zealand

The Annual ANZIAM Applied Mathematics Conference and Annual Meeting of ANZIAM for 2005 will be held in Napier in New Zealand from Sunday 30 January to Thursday 3 February. The conference is sponsored by the Royal Society of New Zealand. The venue is the War Memorial Conference Centre which is situated on the sea front in Marine Parade.

The annual conference of ANZIAM is an established annual gathering of applied mathematicians, scientists and engineers with wide-ranging interests. It provides an interactive forum for presentation of results and discussions by students, academics and other researchers on applied and industrial problems derived in many scientific fields and amenable to quantitative description and solution.

Further information, including details of invited speakers, may be obtained from the Web page:

`http://www.math.waikato.ac.nz/anziam05`

Registration:
Registration circulars are expected to be distributed at the end of August at which time on-line registration will become available. The deadline for registration is December 1.

Accommodation:
Sixty double rooms have been reserved at the Te Pania Hotel directly opposite the conference venue, and another twenty double rooms at the Masonic Hotel (three minute's walk from the venue). More will be reserved if demand is high at either. Bookings at these two establishments may be done when you register on-line. There are several nearby motels and a backpackers for which you need to make your own arrangements.

Mathematics-in-Industry Study Group 2005

Please complete registration as soon as possible (via website preferred)

This is being organised by the Centre for Mathematics in Industry, Massey University, Auckland, New Zealand. It immediately precedes the annual Applied Mathematics Conference: ANZIAM2005, in Napier, NZ.

Dates of MIG2005:	Monday 24th to Friday 28th January 2005
Venue:	Massey University at Albany, Auckland
Director:	Professor Graeme Wake; g.c.wake@massey.ac.nz
Administrator:	Nikki Luke; n.luke@massey.ac.nz
See	http://misg2005.massey.ac.nz http://misg2004.massey.ac.nz

for more information.

Industries who wish to present a problem are invited to contact the Director.

Problems for MISG2005 (as at November 2004):

1. Predicting off-site deposition of spray drift from horticultural spraying through porous barriers on soil and plant surfaces. (Lincoln Ventures Ltd, Hamilton).
2. Development of empirical relationships for metallurgical design of hot-rolled steel products. (New Zealand Steel Ltd, Glenbrook).
3. Optimising the relationship of electricity spot price to real-time input data. (Transpower Ltd, Wellington).
4. Factors associated with trends in bare ground in high country. (Environment Canterbury, Christchurch).
5. Implementing Lanier's patents for stable, safe, and economical ultra-short wing Vacu- and Para-Planes. (Backyard Technology, Queensland).
6. Modelling the physics of high speed product-weighing. (Compac Sorting Equipment Ltd, Auckland).
7. Determining temperature control of wash water in a laundry environment. (Fisher & Paykel, Auckland).

See : http://misg2005.massey.ac.nz .

NOTICES

ERRATUM

The author of the the Centrefold on Roy Kerr (Newsletter No 58, August 1993) was given incorrectly. It was in fact written by Brian Woods. We apologize for the error.

ELECTION OF FOUR MATHEMATICAL SCIENTISTS AS FELLOWS OF THE ROYAL SOCIETY OF NEW ZEALAND

Professor Ian F. Collins, Department of Engineering Science, The University of Auckland, has distinguished himself in the areas of mechanical engineering and applied mathematics, with contributions in solid mechanics and thermo-mechanics, and their applications to aspects of glaciology, metal-forming, friction and wear, structural mechanics, composite materials, geomechanics and geotechnical engineering. He has developed rigorous models of engineering processes which are also workable from an engineering perspective.

Ian Collins is one of the worlds foremost experts on fundamental plasticity theory and its application to mechanical and geotechnical problems. As an international expert on geomaterials he has applied the basic laws of thermodynamics to develop a completely new procedure for developing constitutive models for soils, sand, and other geomaterials. His pioneering work on the application of shakedown theory to predict the performance of layered road pavements has been taken up by engineering groups in the United Kingdom and Australia. He is a profoundly original thinker whose work pushes the subject in a new direction.

Professor Leslie T. Oxley, Department of Economics, University of Canterbury, and Adjunct Professor, University of Western Australia, is recognised internationally for the advances he has made in econometric modelling and testing, particularly as applied to studies of industrialization, economic growth and the measurement of human capital. His work is at the forefront of research using modern time-series econometric methods to advance understanding of both unique historical events for example, the British Industrial Revolution and current issues of central importance, including the determinants of economic growth and the measurement of human capital.

Leslie Oxley has used novel statistical methods to substantiate and refine measures of Gross Domestic Product (GDP), and his outstanding combinations of statistical, mathematical, economic and historiographical skills to create major resources of new time series data for Australia and New Zealand. A unique characteristic of his research, which is published in the leading international journals in economics, economic history and econometrics, is the ability to create advanced research methods derived from econometrics, statistics and mathematics to resolve important controversial issues in economics and economic history.

Leslie Oxley is an outstanding scholar whose innovative research has had a significant impact on his profession.

Professor Boris S. Pavlov, Department of Mathematics, The University of Auckland, has an exceptional international reputation for his mathematical analyses. His penetrating investigations in mathematical physics, published in more than 170 papers in top international journals, have led to significant advances in wide areas of mathematics that include Spectral and Functional analysis and the theory of Riesz bases. His more recent work concerns the discovery of a quantitatively consistent method of modelling quantum networks based on connections with scattering theory and the solvable models of quantum field theory.

Boris Pavlov's research is original and deep; his international standing is recognised by many fellowships and prestigious visiting positions at institutions in Sweden, Czechoslovakia, Germany, France, Austria, Israel and Japan, as well as numerous conference invitations. His contributions to mathematics are also evidenced by the more than 20 PhD students he has supervised.

Graeme C. Wake, Professor of Industrial Mathematics and Centre for Mathematics in Industry, Massey University at Albany, and Adjunct Professor of Mathematics, University of Canterbury, is a talented and versatile applied mathematician who has been instrumental in focussing applied mathematics

on issues of specific relevance to New Zealand, particularly in modelling biological systems in the agricultural, health and industrial sectors. He has applied ingenious mathematics to develop models for the spontaneous combustion of wool, hay and lignite, the growth of pasture for optimum production, population dynamics and control of unwanted animals and plants, and in minimizing the effects of epidemics and environmental damage by pests. In collaboration with biologists and clinical oncologists, he has developed innovative models of tumour cell growth with applications to cancer therapy. His world-class work is reported in more than 165 refereed publications.

Graeme Wake has significantly advanced the teaching and application of mathematics in New Zealand. His enthusiasm and energy have inspired numerous research students and collaborators. He currently directs the Mathematics in Industry Study Group and is a founding member, former President (twice), and Fellow of the New Zealand Mathematics Society; he is the first New Zealander to be elected President of Australian and New Zealand Industrial and Applied Mathematics.

HAMILTON MEMORIAL PRIZE

The 2004 Hamilton Memorial Prize for beginners in scientific or technological research in New Zealand has been awarded to **Dr Thomasin Smith**, Massey University, Palmerston North, for pioneering contributions to the mathematics of the structure and function of proteins and the geophysics of two-phase flows in fractured porous media.

HATHERTON AWARD

The 2004 Hatherton Award for the best scientific paper by a PhD student at any New Zealand university in physical sciences, earth sciences, and mathematical and information sciences has been awarded to Dr Paul Gardner, formerly of Massey University, Palmerston North, for his contribution as lead author of the paper "Optimal Alphabets for an RNA World" published in the Proceedings of the Royal Society (London) B (2003).

INDUSTRIAL MATHEMATICS INITIATIVE IN THAILAND

Massey University at Auckland's Centre for Mathematics in Industry has just completed a two-staged process to assist the Thailand Mathematics community to prepare an Industrial Mathematics Initiative for their country. Professors Robert McKibbin and Graeme Wake from Massey's Centre made extended visits in May and October respectively at the invitation of Thailand's Chulalongkorn University. Both gave seminars and conducted workshops on this theme. Professor McKibbin also was an invited speaker at the National Mathematics Conference of Thailand in May in Chiang Mai and Professor Wake assisted the Co-operative Research Network in Mathematics (Thailand) to present their case for Thai Industry Federation support of a sustained initiative in this area on Monday 18th October. The Centre will endeavour to continue to support this programme as it develops. A synergy is likely to emerge with the local Mathematics-in-Industry Study Groups for Australasia which are currently being run by Massey's Centre until 2006.

CALL FOR NOMINATIONS FOR 2005 NZMS RESEARCH AWARD

This annual award was instituted in 1990 to foster mathematical research in New Zealand and to recognise excellence in research carried out by New Zealand mathematicians.

Recipients to date have been John Butcher and Rob Goldblatt (1991), Rod Downey and Vernon Squire (1992), Marston Conder (1993), Gaven Martin (1994), Vladimir Pestov and Neil Watson (1995), Mavina Vamanamurthy and Geoff Whittle (1996), Peter Lorimer (1997), Jianbei An (1998), Mike Steel (1999), Graham Weir (2000), Warren Moors (2001), Bakhadyr Khoussainov (2002), Rod Gover (2003) and Eamonn OBrien (2004).

The nominations should be forwarded the President of the NZMS, Assoc. Prof. Mick Roberts, Institute of Information and Mathematical Sciences, Massey University, Private Bag 102 904, North Shore Mail Centre, Auckland.

NZMS RESEARCH AWARD

The NZMS Research Award for 2004 has been awarded to **Associate Professor Eamonn O'Brien** (The University of Auckland). Here Professor Marston Conder receives the award from Professor Graeme Wake on behalf of Eamonn at the Science Honours Dinner, Christchurch, 17 November 2004.