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NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

Contents

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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NZMS Council and Officers

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EDITORIAL

Can you imagine it? The ungrateful bastard never did one day's useful work in mathematics. Never! Nothing! Zero!

I gave my students a bonus problem the other day. The problem was to show that every even number greater than 2 is a sum of 2 primes, and the bonus was $2 million. Not that I have $2 million to give away—if I did, it could more usefully fund the deficit of my ailing College of Sciences for six months—but the money will be provided by Faber and Faber for a proof of this, the Goldbach conjecture, supplied within two years. (The proof itself must appear in an MR-reviewed journal within 4 years, which is really pushing it.) In what must be a first for mathematics, a publisher is running a high-profile campaign around a mathematics book, and even better, the campaign is based on maths itself. The book, from which the above quote is taken, is *Uncle Petros and Goldbach's conjecture* by Apostolos Doxiadis:

> "Uncle Petros is a family joke, but his young nephew suspects there is more to this ageing recluse, living alone in a suburb of Athens. He discovers Petros was once a celebrated mathematician, foolhardy enough to stake everything on solving a problem that defied proof for nearly three centuries." (Publisher's blurb)
>
> "Paints a fascinating picture of how a mathematician could fall into a mental trap by devoting his efforts to a too difficult problem." – John Nash

Unfortunately, unlike the famous 19th century prize offered for a proof of the stability of the solar system, if a proof is not forthcoming the money will not go to the best entry received. I'm tempted to place a side bet saying their money is safe. Some might say, with G.–C. Rota, that prime numbers were born to be multiplied, not added; or that a

portrait of madness and further obsession with number theory is not what we want to promote. But let's say instead that any publicity is good publicity, and welcome the book, the publicity, and the prize.

I remember how turned on I was as a teenager by Rudy Rucker's *White Light*, featuring a disgruntled maths professor, an out-of-body experience, Hilbert's Hotel, and the continuum hypothesis (even though I didn't go into set theory, it gave me a brilliant build-up to the moment when I finally learned the actual status of the hypothesis). A more painfully accurate rendering of how mathematicians can be is provided in the short story "The Penultimate Conjecture", reviewed in this issue. Perhaps mathematics hour has arrived.

But wait—is the Goldbach conjecture really so esoteric? It was proved recently (Deshouillers et al., Elec. Res. Announc. AMS 3 (1997), 99–104) that, subject to the Riemann hypothesis, every odd number greater than 5 is the sum of *three* primes. The Riemann hypothesis was the subject of talks in New Zealand by two visiting lecturers last year, one of whom, Michael Berry, in a triumph of popular exposition, worked it into the beautiful conjecture that "the primes contain music" (that, suitably scaled, the distribution of primes has a discrete Fourier spectrum). Roll on that golden age in which mathematics generates a proper interest, a proper respect, a proper appreciation in our wider culture.

Robert McLachlan

PRESIDENT'S COLUMN

Most of us in the mathematical sciences are experiencing a greater amount of work as we struggle to maintain the same (or better) level of activity with a decreasing level of resources. Enrolments in the tertiary sector this year (which at present determines almost completely the level of funding) have flattened out reflecting the higher level of fees and the dropping of the age cohort in the pre-tertiary sector. Changes are afoot in view of the Government's intention to review the tertiary sector. We should take the opportunity of having input to this. The Crown Research Institutes are grappling with changes in the Public Good Science Fund and the role of the New Economy Research Fund (NERF). Preliminary analysis suggested the role of mathematics in this area might have been **slightly** strengthened by this shift.

The events of mathematical consequence of the summer here in New Zealand (what summer?) included three meetings of national prominence: the NZ Mathematics Research Institute Summer Workshop on "Computability, Complexity and Computational Algebra" in Kaikoura, the McNabb Symposium on "Applied Mathematics in Depth" in Auckland, and ANZIAM 2000 in Waitangi. Reports of these appear elsewhere in this Newsletter. The death of former Secretary of NZMS, H. S. (Stan) Roberts in February was a sad note – which occurred just as the book (edited by Stan) on the "History of Statistics in New Zealand" appeared. Stan was a person who achieved a lot especially in the practical use and learning of Statistics in his lifetime. We need such evangelists in the whole area of mathematics. The defence of

- "it might be useful later"
- "it is part of the subject"
- "because it is there"

etc., need to be made but they seem insufficient in today's climate. Is this just my biased perception? We need to maintain our connections across the disciplines and into Society at large. Where are the Stan Roberts' of today's generation? **It is up to us**.

On the popularisation issue, I am pleased to report that planning is underway for Dr Tom Körner's visit as Forder Lecturer 2001. He is set to come in July of that year. His talks listed elsewhere in this issue show it is possible to write about our subject in a more accessible way that attracts and excites a wider audience. Just yesterday, I was pleased to obtain his book "The Pleasures of Counting" and recommend it as pleasurable reading after one night! Tom hails from the Department of Pure Mathematics and Mathematical Statistics in Cambridge.

In June this year Professor John Guckenheimer is touring New Zealand as NZMS Lecturer 2000. John is from Cornell University in the U.S. and is a previous President of SIAM. His popular lecture "Thinking on Thinking" should be of wide interest as well as his talks on his area of dynamical systems. All university groups are hosting John in June 2000.

Accolades seem to be flowing to mathematicians. We note the awards of higher doctorates to two of our senior members in April/May. Professor Douglas Bridges (University of Canterbury) and Dr Graham Weir (Industrial Research Limited), are to receive Doctor of Science degrees from their alma maters Oxford University and the University of Canterbury respectively. Congratulations from us all.

Our joint nomination (with the NZ Statistical Association) of founding President Professor David Vere-Jones for a Science and Technology Medal, awarded by the RSNZ, was amazingly successful. He is to receive the 1999 Science and Technology Gold Medal from the Governor-General at Government House on 23rd May. We again congratulate David and thank him for his achievements. I was pleased to speak on behalf of the NZMS at his retirement function (from the Professorship of Mathematics at Victoria University of Wellington) on 31st January 2000 and present him

with the certificate of Honorary Life Membership of NZMS. The gold medal is of course a much grander accolade!

I am writing this just before the next meeting of the RSNZ Mathematical and Information Sciences Advisory Committee (MISAC) meeting in Wellington at the end of March. This group last met in September 1998. Your council approved Professors Gaven Martin (Auckland) and Graeme Wake (Canterbury) as NZMS representatives on this Committee. Agenda items show a vast amount of activity. More on this later. We must soon consider a membership drive, along with increasing our profile in New Zealand Mathematics. Our Council is also receiving ideas on optimal ways of using our accumulated resources to promote/support mathematics in New Zealand. Please send these in.

An informal meeting with the Australian Mathematical Society president Ian Sloan in Waitangi (their Steering Committee met simultaneously with ANZIAM 2000) was useful. We agreed to have observers at each other's Council meetings, shared information on future directions, and discussed possible joint activities. With Australia hosting the 5th International Congress on Industrial and Applied Mathematics 7-11th July 2003, the Australian Mathematical Society Conference will be "within ICIAM 2003" in Sydney. Should we incorporate the NZ Mathematics Colloquium 2003 as part of an Australian/New Zealand Mathematics Convention? I have suggested this. The director of ICIAM 2003, Dr Noel Barton, has urged New Zealand to "consider how it would like to be involved in ICIAM 2003". Many of us will be involved as individuals but what about Society involvement? Responses are invited. It is impressive how the *whole* Mathematical community in Australia is getting behind the holding of this important conference. I understand that the Australian Mathematical Society has decided to not bid to host the International Congress of Mathematicians in 2006 (2002 is in China).

For myself, a lot of travel is in store. As Dean of Postgraduate Studies for the University of Canterbury, I am attending the Australian Conference on Quality in Postgraduate Research in Adelaide during April and travelling to Sultan Qaboos University in Oman (Middle East) as adviser/examiner in Mathematics later in May. As always, these provide opportunities to enlarge our contacts. I was interested to note the profile of the Department in Oman matches the spread of Applied Mathematics, Pure Mathematics and Statistics in our own Department at the University of Canterbury. I will write a fuller account later. On the return journey I will take the opportunity of renewing contact with colleagues in South East Asia during a brief stop in Singapore. If there is any energy left I might make the Australian Mathematical Society meeting in Brisbane in July!!

Graeme Wake
President

LOCAL NEWS

AGRESEARCH

Biometrics 99, at Hobart, in December was well supported by AgResearch Statisticians. Peter Johnstone gave an invited talk on "Planning Comparative Experiments". David Baird, Harold Henderson, David Saville and Martin Upsdell also participated. Peter is the in-coming President of the Australasian Region of the Biometric Society. David Baird visited Canberra in February where he gave a talk to the Australian Statistics Regional meeting and attended the CSIRO Biological Statistics Research Group meeting in Braidwood.

AgResearch applied mathematicians were equally supportive of ANZIAM 2000 held in the Bay of Islands in February. Glenn Fulford, Ken Louie and Tanya Soboleva gave papers on possum control, clover growth and follicular development respectively, and Sasha Filippov and Tony Pleasants also attended. Glenn Fulford attended the preceding meeting in Auckland in honour of Alex McNabb, and gave a paper on the prevention of childhood epidemics on behalf of Mick Roberts, who was in Brussels talking to the European Commission about mad cow disease.

Mick Roberts

UNIVERSITY OF AUCKLAND

Department of Engineering Science

We have two new Lecturers in Operations Research. Dr Golbon Zakeri, who was a FRST Research Fellow in the Department from 1995 to 1998, has returned after a couple of years overseas. Dr Matthias Ehrgott, a lecturer at the University of Kaiserlautern, is the other new appointee. They are already teaching. In October, Dr Shane Henderson resigned in order to return to a position in the USA, and we miss him. Ian Collins is away on sabbatical leave. Margot Gerritsen is on maternity leave, looking after baby Callum. Professor Li Bo, from the Shandong Institute of Building materials, China, has just arrived and will be visiting us for six months. His interests are in OR.

Over the summer the big event was the ANZIAM Applied Mathematics Conference at Waitangi, 8-12 February. The organizing committee consisted of David Ryan and Andrew Pullan (Co-Directors), Rakesh Ishwarlal (Secretary), Poul Nielsen (Treasurer), Margot Gerritsen, Mike O'Sullivan, and Andy Philpott, and Geoff Nicholls and Steve Taylor of the Mathematics Department. The invited speakers included Peter Hunter and three of our graduates, Peter

Jackson, Graeme Everett, and Bruce Tidey. Our department also provided ten of the student talks and seven of the other talks at the conference.

To relieve overcrowding, our bioengineering group has moved up the road into temporary accommodation until a new building is ready. Construction is planned to start late this year.

Don Nield

School of Mathematical and Information Sciences

Mathematics

Norm Levenberg has been promoted to Asssociate Professor. Jianbei An and Bruce Calvert have been promoted over the Senior Lecturer Bar. Bill Barton and Mike Thomas have received special increments within the Senior Lecturer Range. Paul Bonnington, Maxine Pfannkuch and Philip Sharp have been promoted to Senior Lecturer. Alistair McNaughton has been promoted over the Senior Tutor bar. Greg Oates has been promoted to Senior Tutor. Mohan Chinnapan was promoted to Senior Lecturer; but soon afterwards he resigned to accept a post at the University of Wollongong. Lynne Gilmore, Senior Tutor at the Tamaki Campus, is taking early retirement in April 2000. Peter Dobcsanyi has completed his Ph.D., with a thesis on "Adaptations, Parallelisation and Applications of the Low-Index Subgroups Algorithm". Vivien Kirk had a baby daughter, Katherine Elizabeth, on Monday, 14 February! She weighed 3.4kg at birth and is 49cm long. Vaughan Jones gave a series of three seminars on "Operator algebras" on February 21, 22, 23. On the afternoon of Monday February 21, Vaughan attended a ceremony at Auckland Grammar School, where Mayor Christine Fletcher opened the Vaughan Jones Seminar Room in the library.

Recent visitors include Professor Michael Atkinson (St Andrews University), Professor Zbigniew Piotrowski (Youngstown University), Professor Hongyun Xiong (Tianjin University), Professor Everett C. Dade (University of Illinois at Urbana-Champaign), Dr Kengo Hirachi (University of Tokyo/Osaka University) and Dr John Holt (University of Michigan). John McCormick graduated here as M.Sc. in 1996. He has now completed his Ph.D. at Oxford in Computer Vision, and he visited this Department over the summer.

John Duncan has been awarded a Fulbright Scholarship, for graduate study in the USA. Will Wright has earned one of the "Bright Futures" scholarships awarded by the Foundation for Research, Science and Technology, for his Ph.D. studies. There were only 43 of these scholarships awarded out of many applicants and the award to Will is a tribute to him personally; and also it is a tribute to the Department.

The Third Devonport Topology Festival was held (at Devonport) on February 11, with Professor Vladimir Pestov (VUW) as the invited speaker.

Keith Worsley graduated as Ph.D. from this Department in 1978, and he is now Professor of Statistics at McGill University. Keith has been awarded one of the Killam Research Fellowships for 2000, the most distinguished research awards in Canada. The prizewinners get two years paid study leave, for full-time research and writing.

Seminars

ProfessorGeorgeHavas	(UniversityofQueensland), "Exact linear algebra and extended gcds".
Professor Vaughan Jones	"Operator algebras" (3 seminars).
Dr Andreas Cap	(Erwin Schrödinger Institute, Vienna), "Cartan connections and geometric structures", and "Parabolic geometries".
Professor Everett C. Dade	(University of Illinois at Urbana-Champaign), "Group-graded algebras and Clifford theory" (4 seminars).
Dr Michael Eastwood	(University of Adelaide), "The Archimedean screw and other homogeneous surfaces".
Dr Pavel Kurasov	(University of Stockholm), "Singular perturbations of differential operators and solvable Schrödinger-type operators".
Dr Arkadii Slinko	"Arrow's impossibility theorem and ultrafilters".
Professor Zbigniew Piotrowski	(Youngstown State University), "Separate and joint continuity", and "The plasticity of some metric spaces".
Graeme Aitken	(School of Education), "Achievement 2000–an overview".
Dr Kengo Hirachi	(University of Tokyo/Osaka University), "Invariant theory of the Bergman kernel".
Dr John Holt	(University of Michigan), "Deformation theory of hyperbolic 3-manifolds" (6 seminars).
Dr Bill Barton	(Chair), Jeanette Saunders, Pip Arnold & Mark Phillips, "ACHIEVEMENT 2001–MATHEMATICS: A Panel Discussion".

Dr Denis Hirschfeldt	(Victoria University ofWellington), "Structure and nonstructure in computable structure theory".
Dr Bill Barton	"South Auckland Mathematics Enhancement Project".
Professor David Gauld	"The Poincaré Conjecture 100 years on".
Professor George Anastassiou	(University of Memphis), "Recent advances in approximation theory".
Peter Winbourne	(South Bank University, London), "Constructing narratives about learners' identities".

Garry J. Tee

UNIVERSITY OF CANTERBURY

Department of Mathematics and Statistics

It is with great regret that the department announces that Professor Malcolm Faddy is leaving Canterbury at the end of the year to take up a Chair at the University of Birmingham. The department wishes Malcolm every success in his new position.

Seminars

Dr Daniel Sjoberg	(Lund University, Sweden) "Wave decomposition nonlinear, anisotropic media".
Dr Hilary Ockendon	(University of Oxford) "Mathematical spin".
Dr Karl Svozil	(Technische Universitat, Vienna) "Recent developments in quantum information theory".
Dr Mark Nelson	(University of Leeds) "A simple model of heterogeneously catalyzed combustion".
Dr Shayne Waldron	(University of Auckland) "The eigenstructure of the Bernstein operator".

Chris Price

INDUSTRIAL RESEARCH LIMITED

Applied Mathematics Team

The Applied Maths Christmas Party last year marked also another special occasion—approximately the fiftieth birthday of the Applied Mathematics division (the precise date of establishment remains a matter of contention). Nonetheless, this was a good excuse for a party and produced a great turn out of past and present members, including Robin Williams, who gave an entertaining after-dinner speech. Our thanks go to John Burnell and Graham Weir for organising a successful evening.

The Applied Maths team has weathered the transition to the **N**ew **E**conomy **R**esearch **F**und. Graham Weir and Shaun Hendy were part of a successful NERF tender entitled "Functional Interfaces and Materials". Advanced materials research is a strength of IRL, and this NERF funding will allow us to develop our skills in this area.

We sent a contingent of four this year to ANZIAM in the Bay of Islands. Graham Weir and John Burnell both presented talks on the mixing of granular materials and both were brave enough to perform mixing experiments in front of a live audience. Shaun Hendy gave a talk on shear banding in granular systems and Stephen White talked about pit growth on corroding metal surfaces. Tony (Anthony) Roberts from the University of Queensland visited us after ANZIAM and gave a seminar on "The Mathematical Characterization of Porous Materials".

Stephen White recently visited Japan for a week where he collected data on the Uenotai geothermal field and spent time strengthening contacts with the Japanese geothermal program. Steve has mastered the Japanese food and beverage approach to business, and so the future of Applied Maths in Japan looks rosy.

Finally, one of Applied Maths most famous sons Stan Roberts had a wonderful send-off at the Wellington Anglican Cathedral last month. Stan died aged 80. Among his many contributions Stan will be remembered for his *History of Statistics in New Zealand*, published last year. Stan had a great sense of humour and is lovingly remembered by a great many. Ex-Applied Maths directors and government statisticians were there en masse. The eulogy by ex-director Robin Williams was particularly informative on parts of Stan's life that few knew about. His involvement

with music and groups like Amnesty International was well chronicled. Among those who flew in from afar to honour Stan, was ex-Applied Maths member Ross Leadbetter, professor at the University of North Carolina, currently visiting ANU. Thank you Stan for a wonderful get together! It's unlikely that we shall see such a gathering again.

Shaun Hendy and Kit Withers

LANDCARE

Nicolas Robidoux has completed a post-doc with Robert McLachlan at Massey and is currently research scientist-colleague with Aroon Parshotam at Landcare and Peter Read in the Applied and International Economics department, Massey. The research work involves coupling process models with Landcare's GIS databases using GIS data for country level carbon absorption curves under pro-active land use change policies in a market driven environment.

Aroon Parshotam

MASSEY UNIVERSITY

Institute of Fundamental Sciences

Mathematics

"*To be or not to be that is the question…*".

Maybe this is what the academics (including the mathematicians) at Massey's Turitea campus are wondering just now and in what state (not Denmark) they will be when the next Local News article from here will be compiled (hopefully somebody will still be here to do it). The Vice-Chancellor is having a "repositioning" exercise designed to save several million dollars.

It is now a year ago that we moved to the refurbished 3rd floor of Science Tower B. After some months of teething problems with students getting lost in the maze (with dead ends) on our floor, things have settled down mostly due to adequate sign-posting. That we are on the floor below the Chemistry Laboratories became clear when water (or something worse) started to dissolve the ceiling in Gillian's office and consequently soaked the carpet. The keen bridge players still ignore all adverse weather conditions and faithfully amble across to the Social Science Tower Common Room to play and enjoy lunch together.

We welcome back Charles Little who has spent a year at the University of Klagenfurt, Austria, working with Franz Rendl and Ilse Fischer. During his travels he presented seminars at the universities of Klagenfurt, Ljubljana, Ottawa and Waterloo, Charles University in Prague, the University of Mining in Leoben, Austria and at research institutes in Amsterdam (CWI) and Grenoble, France.

Liz Davis has returned from her year's trip going around certain parts of the world. Most of the time was spent cycling through Europe. Unfortunately she will not be coming back to our Institute as she has accepted a position with Glenda at the College of Education. Liz, thanks for all that excellent work you have done for us.

The first two months of this year have kept many mathematicians on the move. Conferences (thus fun and parties) galore! The venues were ideal for a holiday as well!

The New Zealand Mathematics Institute's Summer Workshop (held in Kaikoura) started when the new millennium was not a week old. The topic of the Workshop was: "Computability, Complexity and Computational Algebra". The Massey Mob comprised of Feng Ming Dong, Barbara Holland, Robert McLachlan, Kathi Huber, Matt Perlmutter, Ben Chor and the two Post-grad students Avi Shalav and Paul Gardner.

Igor Boglaev, Dean Halford, Robert McKibbin, Tammy Smith and Bruce van-Brunt attended the "McNabb Symposium" held on the Tamaki Campus at the University of Auckland 7–8th February this year. Igor presented a paper on "Modelling Internal Oxidation".

And if this was not enough, Igor, Dean, Robert, Tammy and Bruce (with most of the McNabb Symposium participants) moved north to the Copthorme Resort, Waitangi, Bay of Islands where New Zealand hosted the "2000 ANZIAM Applied Mathematics Conference". Igor gave a talk on "Domain Decomposition for Convection-Dominated Diffusion Problems", Robert McKibbin on "Dispersion of particles by the wind" and Tammy (jointly with Robert McKibbin) on "An investigation on boiling processes in hydrothermal eruptions".

At last but not at least: Ruahine 2000. Barbara Holland and Mike Hendy organised this annual research meeting of mathematical and biological students and researchers in Mathematical Phylogeny which was held at the Ruahine

Lodge in Dannevirke. Besides the organisers, Kathi Huber and Benny Chor attended.

Mike Hendy has taken up his ten month position as Mercator Visiting Professorship at the University of Greifswald. Mike and Beth arrived there safe and "well" after a horrific journey. Mike's host group is the Institute of Mathematik and Informatik. The Institute has just 17 permanent staff in three different buildings. Biomathematik is their most populous programme.

Barbara Holland has gained a German Academic Exchange Service grant (DAAD) to study for seven months in Germany. After presenting a paper (jointly with Mike Hendy) at the Computational Biology Conference at Tokyo, Barbara has joined Mike in Greifswald.

Kathi Huber left us in February and will be taking up a Lectureship at the Mid Sweden University in Sundsvall. Good luck Kathi!

Feng Ming Dong recently finished his contract. From Charles Little: "Early on the morning of March 25, Kee Teo and I said goodbye to Feng Ming Dong at the railway station in Palmerston North. Many of you will remember Dong from the colloquia at Victoria and Canterbury and the recent meeting in Kaikoura. Dong's two years at Massey have been extraordinarily productive—he has produced a dozen papers on chromatic polynomials, either on his own or with various combinations of co-authors, and has astounded us with his insights and ingenuity. A major achievement of his stay was his elegant proof of a conjecture due to Bartels and Welsh, settling a question that had defeated even Paul Seymour. We shall miss him at Massey, but he is clearly a man from whom the world of graph theory will be learning much more in the future. He has been appointed as an Associate Professor at Xiamen University, Xiamen, Fujian, China. We extend our best wishes to him as he enters the next stage of a most promising career".

Tammy Smith has been appointed Marsden Postdoctoral Fellow in our Institute and will be working with David Parry on "Molecular and Filament Structure of Hair in Health and Disease".

Margaret Walshaw has successfully defended her thesis titled "Paradox, partiality and promise: A politics for girls in school mathematics". Congratulations Margaret! Margaret has a part-time position in the Department of Technology, Science and Mathematics Education and will be taking responsibility for a new foundation paper in mathematics within the Foundations Studies Programme at Massey University, which is to be launched in Semester 2.

Kee Teo received the Institute's Distinguished Teacher's Award for 100 level teaching and Bruce van-Brunt the Award for teaching at 200–300 level. Congratulations to you both!

Seminars

Dominic Welsh	(Oxford University), "Counting polynomials for channel assignments, hypergraph colouring and lattice point enumeration".
Charles Little,	"A characterisation of Pfaffian near bipartite graphs".
Geoff Whittle	(Victoria University), "A short history of matroid representation theory".

Marijcke Vlieg-Hulstman

Institute of Information and Mathematical Sciences

Mathematics

Shaun Cooper will be taking Duties Overseas June 2000–January 2001. He will based at the University of Minnesota, USA, visiting Dr Dennis Stanton. He will work on q-series and the work of Ramanujan with Dennis. Conferences to be attended are The Work of Srinivasa Ramanujan, University of Mysore, India, and the Workshop on q-series, University of Illinois, USA.

Dr Lutz Grosz arrived on 29 March to take up a position of Lecturer in Mathematics. He completed his Diploma of Mathematics at the University of Hannover, Germany, in 1988. In the thesis he investigated semigroups generated by dissipative operators. In 1989 he jointed the Research Group for Numerical Methods on High Performance Computers at the University of Karlsruhe, Germany. Here he worked on scalable software for the solution of non-linear PDEs. After 7 years at Karlsruhe, Lutz took up a position in the School of Mathematical Sciences at the Australian National University, to contribute to the scientific software project with Fujitsu, Japan. He finished his Ph.D. in Mathematics in 1997 at the University of Karlsruhe with a thesis on a-posteriori error estimates for finite element methods. Recent research interests lie in the area of preconditioned iterative linear equation solvers.

Mike Meylan attended the ANZIAM conference and presented a paper "Wave Scattering in the Marginal Ice Zone".

James Sneyd arrived in New Zealand on 6 January, to commence his post as Associate Professor, Mathematics, and to take over as mathematics subject coordinator. Soon after his arrival he attended the ANZIAM meeting. James supplied the following biographical information: I did my BSc at Otago, followed by a Ph.D. at New York University. After this I spent a post-doctoral year at Oxford, followed by a period as assistant professor at the University of California, Los Angeles. I then moved back to NZ, Canterbury University, where I worked for three years, helping to set up the Biomathematics Research Centre. Then off to the University of Michigan for the next three years, and then here. I'm currently still officially at the University of Michigan, as full Professor. My major achievement was winning the prize for the best mathematics book of 1998 ("Mathematical Physiology", J. Keener and J. Sneyd, Springer-Verlag) from the American Association of Publishers. My research interests are in mathematical biology and physiology, particularly the application of differential equation theory, nonlinear dynamics, and bifurcation theory to the study of self-organisation and nonlinear waves. Most recently I've been studying the mechanisms underlying the propagation of calcium waves in a range of cell types, but I've also worked on the visual system, neurophysiology, neurosecretory cells, insect societies, and morphogenesis.

Adrian Swift attended ANZIAM, held at the Copthorne Resort, Waitangi, Bay of Islands. It was an excellent conference, the largest yet. Great news was hearing (at the Conference dinner) that the first New Zealand winner of the Cherry prize (for best student talk) was from Albany (Chris Reid, supervised by Scott Whineray).

Yeh took a short period of Duties Overseas in Taiwan to work on automata theory.

Seminars

Dr Lutz Grosz (ANU), "Preconditioning of Linear Systems by Incomplete Block Factorisation".

Adrian Swift

UNIVERSITY OF OTAGO

Department of Mathematics and Statistics

There is a double issue for Otago this time as no report was given for the December Newsletter due to Lenette being on leave. That confirms who does the important work at Otago.

Student numbers in mathematics have increased slightly at Otago, while those in statistics have decreased in response to a lower 100-level Health Science cohort and imminent changes in major subject requirements. Our dependence on service teaching is sometimes worrying, but necessary to ensure that Otago graduates in science and related disciplines have sufficient backgrounds in the mathematical sciences.

Michael Albert attended the 40th International Mathematics Olympiad in Bucharest, Romania, as deputy leader of the New Zealand team. Despite some initial technical problems (a lost passport in Frankfurt) they managed to get the team to the venue in good shape. Their Romanian hosts organized a wonderful event, especially considering the difficult financial situation in the country. The competition itself was, as they had expected it would be, very difficult. As a result Michael felt that some of our students performed below their true potential, owing to being unable to get started on several of the problems. Nevertheless, the team returned with a bronze medal (one point short of silver). To give some flavour of the competition, the easiest problem of the two days was the following: characterize the finite sets, S, of points in the plane which have the property that for every pair of points in the set, the perpendicular bisector of the segment joining them is an axis of symmetry of S.

Michael also attended the NZMRI Summer Workshop on Complexity Theory in Kaikoura 8–15 January 2000. The organizers presented a superb programme of internationally renowned speakers on a variety of interesting aspects of the subject. He was pleased to reacquaint himself with old friends, rekindle old interests, and meet many members of the NZ mathematical community. Oh yes, the dolphins were quite good value too!

In July/August of 1999, Robert Aldred was an invited speaker at the 1999 Summer Workshop on Graphs and Combinatorial Designs at the University of Hawaii at Manoa. The meeting was well attended by mathematicians from North America, Europe and Australasia and provided a stimulating atmosphere in which to pursue common research interests.

Richard Barker spent 9 days in Fort Collins (Colorado) working on implementing new mark recapture models developed as part of his Marsden funded research into the computer program MARK. Happily, the visit also included some practical help in a sharp-tailed grouse sampling problem.

John Clark was one of three invited overseas speakers at the 32nd Japanese Ring and Representation Theory Symposium held on 5–7 October 1999 at Yamaguchi University, Japan. He enjoyed the mixture of projective

modules, raw fish, noetherian rings, and (for goodness) sake.

In November Coralie Daniel attended the Mathematics Education Into the 21st Century Conference in Cairo, and gave a paper presentation on creating realistic environments for the development of mathematical thinking among students with different abilities and aptitudes. She was one of eight people attending the conference who was nominated as a Casio Visiting Scholar so that some assistance with conference costs could be given. Because of its site and the support of the Third World Forum, the conference attracted numbers of scholars from countries with a non-Western orientation and this added a dimension that was both different and stimulating.

Vernon Squire participated in ANZIAM 2000 held at the Copthorne Resort, Waitangi, in February, along with Tony Dixon who is a postdoctoral fellow on Vernon's Marsden grant. Two papers were presented: "An Iceberg in Shore Fast Sea Ice and Other Tales" and "Multiple Scattering in the Marginal Ice Zone", but more importantly the pair met up with past Otago sea ice colleagues Colin Fox, Mike Meylan, and Siobhan O'Farrell to have a good natter about how important ice physics is to the future of Humankind and other pressing issues. The conference was very enjoyable and the quality of talks and refreshments high.

David Fletcher attended the NZ Marine Sciences Society Conference in Wellington from 1–3 September 1999. Unfortunately he contracted a severe bout of flu on the way up north and spent most of the conference flat on his back in the local (slightly disreputable) backpackers! Despite this, his co-authors Sam DuFresne and Steve Dawson (Marine Science at Otago) gave a good account of their work on designing line transect surveys for estimating the abundance of marine mammals.

Derek Holton (along with a number of other New Zealanders) attended the interesting Delta 99 Conference on mathematics education at the tertiary level held at Laguna Quays, near Prosperine in Queensland from Nov 21–24, 1999. If nothing else, it was a consolation to hear that many of our problems at this level are shared by most Western countries. There was a general concern at increasing numbers and falling standards but there were a number of interesting talks and the plenary speakers were uniformally good and stimulating. To get a flavour of the meeting you might like to log in to `www.sci.usq.edu.au/delta99.html`. The web site still seems to be operating.

One of the features of the conference was the location. None of this university college accommodation! Laguna Quays looked as if it had been established to lure rich Japanese golfers. Participants were housed in spectacular "villas" next to a lush golf course. If your appetite has been whetted by this, you might like to know that Delta 01 will be in the Kruger National Park. So get writing your paper now.

Dennis McCaughan and Gerrard Liddell provided sessions for the Hands on Science Summer Camp in January. Dennis ran a week-long cryptography project for 9 highschool students on techniques of encipherment from ancient Rome to the Internet. The students had fun with popular code systems: cricket umpire signals, yacht racing flags from the Louis Vuitton Cup, naval flags including Nelson's famous signal at Trafalgar, Morse code, and semaphore. Long-established ideas are still used today in audio or digital scrambling systems. Dennis reviewed the developments of the 1970s and 1980s in Public Key Cryptography, including digital signatures and private signature systems. The students used Mathematica to do the calculations.

Gerrard Liddell ran a session entitled "Finding yourself, surveying the horizon". This year inclement weather and injury kept the student surveyors inside, away from the real theodolites and generating virtual scenes instead. This seems an ideal medium in which to impress aspiring scientists with the value of vectors and other mathematics.

Bryan Manly attended the American Statistical Association and other statistics meetings in the USA from 8-12 August 1999.

John Curran and John Shanks are again involved in running the Problem Challenge competition for children at Intermediate Schools. This competition was started in 1991 and is now well-established throughout New Zealand with 700 schools and about 35000 children taking part. Problem Challenge involves five sets of questions (five questions each) held about a month apart starting in April. At the end of last year an additional harder competition "The Final Challenge" was offered to those children who had scored well in the main competition. There were some impressively good results and those at the top thoroughly deserved their prizes. The Final Challenge is likely to become a fixture. A second book of past Problem Challenge question sets has just been released and is available, along with the first book, from the Department.

The following information was accidentally missed from our contribution to the August Newsletter. Peter Fenton was a Plenary Speaker at the NZ Association of Mathematics Teachers held in Dunedin in July; and he, Derek Holton, and Coralie Daniel also presented workshops at the conference. Peter and Coralie presented a joint plenary session at the Colloquium and Josh Downer and John Enlow presented papers.

Comings and Goings

Visitors: Mrs Jeanette Trotman has been awarded The Royal Society of New Zealand 2000 New Zealand Science, Mathematics and Technology Teacher Fellowship for "Graphics Calculators at the Interface between Mathematics and Science". Jeanette is on leave from Columba College, Dunedin, for the period of the contract (1 Feb 2000–31

Jan 2001) and the Department of Mathematics and Statistics together with Portobello Marine Laboratory are the host organizations.

Mrs Ruth Mitchell from Colorado State University is teaching two Statistics papers in the first semester 2000. This is Ruth's second visit to Otago where she enjoys the South Island scenery and tramping and cycling. It is nice to see her back here again.

Prof Richard Nowakowski is on leave from Dalhousie University, Halifax, Nova Scotia, Canada, from January–mid-April 2000. Richard is collaborating with Derek Holton, Robert Aldred and Michael Albert on graph theory, game theory and combinatorics. This is Richard's second visit here also.

Resignations: Charlie Laman retired as a Teaching Assistant in September and has returned to Malaysia while awaiting his Ph.D. examination result. Geoff Martin resigned as Programmer/Support Person on 18 February 2000 to pursue postgraduate study in Computer Science. Rohan Maheswaran resigned as a Teaching Assistant in January to return to Sri Lanka for six months on family matters. He will return to his Ph.D. in 6 months.

Achievement 2001 or 2002

Derek Holton has been a member of the Maths Expert Panel which is meeting to produce Achievement Standards for the new qualifications system that was supposed to begin in 2001. At that time National Certificate of Educational Achievement Level 1 was to replace School Certificate. In 2002, Sixth Form Certificate was due to go (in favour of NCEA Level 2) and in 2003 it was Bursary's turn. Apparently now everything has been delayed for a year but here's the basic idea so that you can see whether you like it or not.

As far as mathematics is concerned, each of the four subjects from School Certificate to Bursary is to be divided into from 5 to 8 Achievement Standards. It's almost certain that School Certificate maths will be 8 ASs. Each traditional subject will be worth 24 credits and at least half of these are to be assessed externally. Certainly a number of ASs will be examined internally.

At the moment the panel is working on both Sixth Form Certificate and Bursary mathematics. It's not quite sure how many ASs there will be for each one but the Maths with Calculus looks like being about 6.

One final thing that should be pointed out is that the new system is built on standards. So each AS has a standard that must be reached. In some ways then the concept is based on Unit Standards. But unlike Unit Standards, ASs will be awarded with credit, merit and excellence, in ascending order.

I must say that I am very concerned about the "modularisation" of mathematics that is taking place under this scheme. I'm not sure that it is for the good of the subject in the long run.

Anyone who would like more information or who would like to comment on Achievement 2002 should email Derek at `dholton@maths.otago.ac.nz`.

Seminars

Dr Kathleen Liberty	(Department of Education, University of Canterbury), "Time series research methodology in mathematics education".
Mike Thomas	(The University of Auckland), "Processes, objects and concepts in algebra and calculus".
Bill Barton	(Department of Mathematics, University of Auckland), "An archaeology of mathematical concepts: Sifting languages for mathematical meanings".
Michael Albert,	"What shape an ape's nape?".
Jozef Sirán	(Slovak University of Technology, Bratislava, Slovakia), "Triangle group representations and their applications to graphs and maps".
Roger Littlejohn	(Invermay Agricultural Research Centre), "Using the EM algorithm to fit the Diggle-Zeger model for hormone profiles and other mixture models".
Jon Yearsley	(Department of Zoology, University of Aberdeen), "How reliably can spatial patterns be compared?".
Ian Allison	(Antarctic CRC, University of Tasmania), "The Mertz Glacier Polynya Expedition".
Peter Johnstone	(Invermay Agricultural Research Centre), "Interpreting comparative experiments on parasite burdens in animals using randomization and canonical variates".
Bryan F J Manly and Darryl MacKenzie	"A cumulative sum type of method for environmental monitoring".

Jorge A. Navarro-Alberto, "The use of generalized linear models for the analysis of species co-occurrences".

Gareth Hegarty (University of Auckland), "Weak solutions and galerkin approximations".

Richard Nowakowski (Dalhousie University), "High-(and low)-lights of game theory".

Richard Nowakowski (Dalhousie University), "Combinatorial game theory".

Lenette Grant

UNIVERSITY OF WAIKATO

Department of Mathematics

Warren and Suzanne Moors are the proud parents of a son. Fraser Brian Moors was born on 14 February and weighed 8lb (or 3.6kg) at birth.

The Dean of our School has approved the establishment of a new position in the department. We hope to be able to get a new staff member in time for the start of 2001. An advertisement for the position is expected to be out soon.

Yuri Litvinenko is visiting Ian Craig for a month from the end of March. Yuri is originally from the Lebedev Institute in Moscow, but has been working as a NASA postdoc at the University of New Hampshire, Durham. His research interests are in astrophysics and magnetohydrodynamics. He, Ian, and others will be working together on magnetic reconnection.

The department was well-represented at the ANZIAM conference held recently in Waitangi. Alfred Sneyd, Ian Craig, your local correspondent, along with a postdoc, Paul Watson, and four postgraduate students attended this conference. Our contingent presented five talks. Alfred recently attended the Minerals, Metals and Materials Society Annual Meeting held in Nashville. He presented a paper in the Light Metals session.

Despite having your local correspondent as supervisor, Muni Reddy recently completed the requirements for a Ph.D. degree. His thesis was titled "The structure and average discrepancies of lattice rules for numerical integration". Muni is now working as a lecturer at the University of the South Pacific.

The saga of the cellphone transmitters is still continuing, though it looks almost certain that the transmitters will be installed on the roof of our building.

Seminars

I. Hawthorn, "Elementary ideas involving symmetry and physics".

K. Broughan, "The prime number theorem—Part A".

W. Moors, "Topological games and topological groups".

Z. Piotrowski (Youngstown State University), "Separable and joint continuity".

A. Filippov (Donetsk Institute for Physics and Engineering, Ukraine), "Attractive behaviour and critical phenomena".

T. Langtry (University of Technology, Sydney), "Quadrature in the unit cube: lattice rules and discrepancy".

S. Sciffer (University of Newcastle, Australia), "The mysterious ORBIX".

J. Cao (University of Auckland), "Generalized open and closed sets and applications".

Stephen Joe

Department of Statistics

Our department has been joined recently by Alec Zwart. He is replacing Sharon Gunn as tutor responsible for our main-stream first year statistics course. Alec has a Ph.D. in Applied Mathematics and comes to us from a postdoctoral position with NIWA. He is currently enrolled in a MSc in Statistics. We have also welcomed Bruce Miller who is working in a part-time capacity as tutor for the first year Management Statistics course. Bruce comes from a position as Quality Manager for Fisher & Paykel and so brings a wealth of experience in industrial and

management statistics.

On the departure side, I-Ming (Ivy) Liu has recently completed her one year lectureship with the department. She has been offered a lectureship with Victoria University which we understand she will take up following the birth of twins, expected in May. We wish her all the best for her future in Wellington and as a new mum.

Graduate student Gareth Ridall has successfully completed his masters with his thesis entitled *Longitudinal Data Analysis*. He is now heading to Brisbane, where he will embark on his Ph.D.

Visitors to our department include Dr Ken Russell from the University of Woollongong, Australia, who was here until mid-February and also Dr Dan Coster from Utah State University who will be here until mid-year. We will be visited by Dr Bruce Weir and Dr Christopher J. Basten from the North Carolina State University. They will present a Two-Day Workshop on Continuous and Discrete Trait Mapping on 11–12 July 2000. Further information and registration details can be obtained by visiting our web site at `www.stats.waikato.ac.nz`.

Seminars

Dr Paul Murrell	(University of Auckland), "Omegahat graphics".
Dr Roger Sugden	(Goldsmiths College, London), "Exact linear unbiased estimation in survey sampling".
Dr Don McLeish & Dr Cyntha Struthers	(University of Waterloo, Ontario), "Sequential design for generalised linear models".
Dr Jerry Lawless	(University of Waterloo, Ontario), "Analysis of duration times in clinical and observational studies".
Dr Dan C. Coster	(Utah State University), "Constructing optimal run orders of fractional factorial designs by generalized foldover and simulated annealing".
Dr Duncan Murdoch	(University of Western Ontario), "Perfect sampling: Not just for markov chains".

Judi McWhirter

VICTORIA UNIVERSITY OF WELLINGTON

School of Mathematical and Computing Sciences

Top International Award to Dr Denis Hirschfeldt

Congratulations go to Denis Hirschfeldt on winning the Sacks Prize in Mathematical Logic. Denis is here supported by the Marsden Fund for Basic Science to work with Professor Rod Downey. He graduated from Cornell University Ph.D.\ in 1999, under the supervision of Richard Shore. His thesis is concerned with questions relating to computable model theory.

The Sacks Prize in Mathematical Logic is named for Gerald Sacks, professor of mathematics at both Harvard and MIT. Professor Sacks has had many of the most famous logicians as his students. It is given to the student whose Ph.D. thesis is regarded as the best worldwide. It is given under the auspices of the international Association for Symbolic Logic. It has a cash award.

Dr Hirschfeldt will take up a position at the University of Chicago when he finishes his Postdoctoral Fellowship here in October. Just in case you missed it, the following article appeared in the nation's press over the weekend:

BLUE SKY RESEARCH FOR\\TOP ACADEMIC

> Computers might be limited in what they can do, but this doesn't seem to place limits on the work of Victoria University post-doctoral fellow Denis Hirschfeldt in trying to understand them.
>
> He believes that by looking at what they cannot compute, he can better understand what they can.
>
> Dr Hirschfeldt was this week named joint winner of the Sacks Prize in Mathematical Logic, the prestigious United States award for the world's best Ph.D.\ thesis in Mathematical Logic.
>
> His field of study, combining the disciplines of Mathematics and Computer Science, looks at what

kind of mathematical functions computers are theoretically capable of performing.

He described his work as ``blue sky'' research. Breakthroughs in computer efficiency might result from his research, but he said his work was about ``understanding''.

Dr Hirschfeldt graduated with his doctorate from New York State's Cornell University last year before coming to Wellington and takes up a position at the University of Chicago in October.

21 students successfully completed our new first year course *Cultural and Social Dimensions of the Mathematical and Computing Sciences*. They studied a wide range of topics: Counting from the Beginning (a history of numbers), The World in Chaos, Beginnings of Social Statistics and the *Average man*, A Brief History of Infinity, Doing Mathematics on Machines, and Stunning Ideas in Operations Research. Already 30 students are signed up for the course later this year.

Many of us attended and enjoyed Rod Downey's Computability and Complexity workshop in Kaikoura. It was a great success with 150 attendees, despite the foul weather. Thanks to Rod and Denis for all of their hard work on this.

Vladimir Pestov and Finlay Thompson both spoke at the conference on Lie groups, algebraic groups, quantum groups and their representations (LAQ'99) held in Sydney (UNSW) in late November.

Rod Downey gave talk at the Combinatorics workshop in Brisbane in November 1999. He then spent 3 weeks in December in Singapore giving a series of invited lectures.

SS Goncharov from the Mathematics Institute at Novosibirsk visited in late November/early December 1999. He gave a series of talks on the structure of countable boolean algebras.

Stefan Berridge, a former graduate student in statistics, has won a fully funded Ph.D. scholarship to take up in the Netherlands.

We welcome new statistics lecturer Dr Saralees Nadarajah from Nottingham, whose field of interest is extreme value theory.

Khanhav Au, a student in Statistics, has won the VUW Science Faculty Ph.D. scholarship to commence this year.

Professor David Vere-Jones was farewelled at a gathering at the end of January to mark his retirement. At the gathering he was presented with life membership of the NZMS by Graeme Wake and speeches of appreciation were given by colleagues and friends to mark his long career. He will continue working on his Marsden grant until June.

Mark McGuinness got to visit Antarctica for five days, as part of his collaboration with Joe Trodahl at the School of Chemical and Physical Sciences at Victoria University of Wellington. Kerry Landman from the Mathematics Department at the University of Melbourne visited Mark for a week in December, to work on a couple of nonlinear diffusion problems, including the penetration of solar radiation into sea ice.

Andrew Tideswell joins us as the recipient of a Ministry of Education Teacher's Study Award, to do an MSc in Mathematics supervised by Lindsay Johnston and Megan Clark. He will study the impact of applying graphical calculator technology to the secondary school mathematics curriculum, and will be doing field work at a number of secondary schools in the Wellington region.

In February Vladimir Pestov visited UNSW upon Michael Cowling's invitation to start a joint project, and was the Principal Speaker at the annual Devonport Topology Festival.

Promotions late last year were

Over the salary bar for Lecturers: Ray Nickson; From Lecturer to Senior Lecturer: Judy Brown, Gillian Dobbie; To a higher point on the scale for Senior Lecturers below the bar: Peter Smith, Ewan Tempero; Over the salary bar for Senior Lecturers: Peter Andreae, Robert Biddle, Peter Donelan; From Senior Lecturer to Reader/Associate Professor: Mark McGuinness; To a higher point on the range for Readers/Associate Professors: Megan Clark, Vladimir Pestov.

Seminars

Tony Hoare, FRS (Microsoft Research, Cambridge, UK), ``Unifying theories for logic programming''.

Vladimir Pestov ``Amenability: from Banach-Tarski paradox to concentration of measure''

Zbigniew Piotrowski(Youngstown State University), ``Separate and joint continuity''

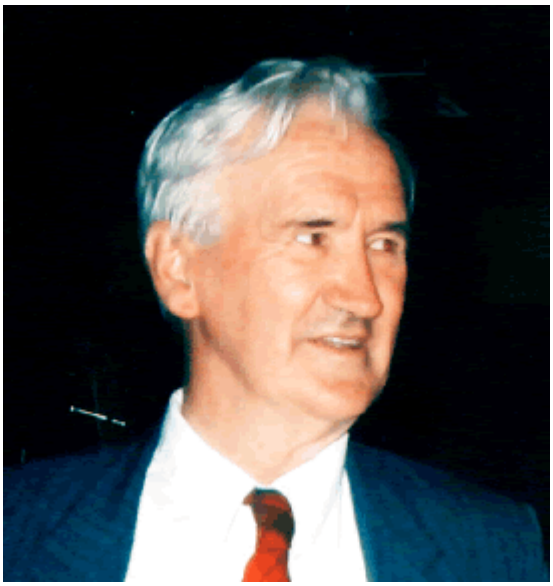
Rod Downey ``On reals and their presentations''

Professor K. H. Pollock (North Carolina State University), ``The design of large scale wildlife monitoring studies''

Dr Konstantin (Kostya) Borovkov (Mathematics and Statistics Department, University of Melbourne), ``On simulation of random vectors with given densities in regions and on their boundaries'', and ``On asymptotic behaviour of weighted sample quantiles''

Mark McGuinnes

McNABB SYMPOSIUM



APPLIED MATHEMATICS IN DEPTH

This event marking Dr Alex McNabb's 70th birthday was held in the University of Auckland (Tamaki campus) 7--8th February 2000. 54 registrants attended and 27 conference presentations were made, including an address by Alex. Attendees came from England, Australia, Indonesia and New Zealand. Most continued on to ANZIAM 2000 immediately thereafter in Waitangi. All enjoyed the conviviality and opportunity to pay a tribute to Alex who is now a Senior Visiting Scientist at the CSIRO in Canberra. A highlight of the McNabb Symposium was the conference dinner in St Heliers at which many attendees spoke. Especially enjoyable was the speech of Professor John Butcher (Auckland) which is published below.

A pre-conference volume was available and seventeen full papers from this have been submitted for consideration for special issue(s) of the Journal of Applied Mathematics and Decision Sciences which will be in honour of Alex McNabb. The conference was organised by Robert McKibbin (Massey), Steve Taylor (Auckland), Graham Weir (IRL, Wellington) and Graeme Wake (Canterbury). Support was received from the New Zealand branch of ANZIAM and the Universities of Auckland and Canterbury (the latter being Alex's first university) which is warmly acknowledged.

Graeme Wake
University of Canterbury, March 2000

AFTER-DINNER SPEECH BY JOHN BUTCHER AT THE MCNABB SYMPOSIUM

7th February 2000

I am greatly honoured to have been asked to speak on this auspicious occasion. I will start by announcing, as part of the theme of my remarks, that I will be presenting a meditation on the name Alex McNabb.

Alex as everyone knows, is the Big Mac of New Zealand Applied Mathematics. If ``Mac'' means ``son'', this would make him the son of New Zealand Applied Mathematics but he could better be described as the father. He is of course, not the first person in New Zealand to distinguish himself in Applied Mathematics but he is pre-eminent within the current generation and deserves the dynastic title of ``Father''.

I have it on good authority that Nabb means Abbott and that Alex is therefore descended from a celibate cleric. I am not sure what this tells us about the colleague we are honouring today so I will pass on quickly to another McNabb, this one fictional and one which emphasises another meaning of ``Nab''---that is ``purloin''.

John MacNab was invented by the author John Buchan to represent a group of three people who had confided in each other that they were passing through difficult times of their lives. Each was highly successful in his own chosen sphere of activity but all challenge seemed to have gone out of their lives. They decided that the cure for this ennui might be to take on the pseudonym of John MacNab and to invent daring tasks for themselves. They announced to a number of landowners that they would kill a deer or other game animal on their estates and get away scott free with their plunder.

Of course they were *gentlemen*, not *poachers*, and the booty would be returned to the rightful owners with \pounds 50 for the trouble (if they had lost the challenge they would have paid a higher fee). The John MacNab novel goes on to recount how they went about these feats of daring, how they met interesting characters on the way and how in the end they overcame their *taedium vitae* and found happiness where this had not been expected.

Becoming a mathematician is also a response to a need for challenges. Not to overcome the boredom of the wealthy for a short time, but to devote oneself to a lifetime of solving problems much more demanding and profound than those encountered by a recreational robber. The life of a mathematician, though essentially solitary, often involves contact with interesting characters and happiness can come out of it in ways that were not always as expected.

I would like to say a little about a change of culture that I have observed over the last 40 or 50 years. There was a time when young people respected the accumulated skills and knowledge of older people -*that is the accumulated wisdom*---more than I think they do today. Part of modern political correctness is to regard all people as equal independent of what are called ``ageist'' considerations.

Of course all people are equal---whoever said they weren't? But people have different roles and functions. It is the social responsibility of people, as they become older, to preserve the knowledge they have learnt from their own elders and acquired through their own discoveries. It is also their responsibility to pass this on to later generations. The young have no corresponding responsibility but they are well advised to make the most of having experienced colleagues to learn from. They can choose to learn from their older colleagues and thus to start their own careers at a more advanced and sophisticated level or they can handicap themselves.

The old lamented DSIR of which Alex was a prominent part, no longer fits into accepted structures but it was quite a good model for preserving, maintaining and enhancing received scientific knowledge. Young scientists and mathematicians and more established scientists and mathematicians worked together so as to provide a precious repository of knowledge and to ensure that a suitable environment existed to help the development of the young. It has been said that ``Youth is wasted on the young'' The real tragedy is that Wisdom is sometimes wasted on the old. It was at the Applied Mathematics Laboratory, as a Summer student that I wrote my first paper, published in *Biometrika*. If I could remember Alex helping me with it, then I would have proof that I had met Alex earlier than anyone else present tonight. I would then have won the competition to receive a free dinner tonight!

A little known fact about Admiral Lord Nelson illustrates the point I have been making, that the young have things to learn from the old. It also shows that not all of scientific or other knowledge need be complicated and high-falutin. Everyone believes that the last words that Nelson said were ``Kiss me Hardy''. This is only part of the story and admiralty records, under embargo until 2000, reveal that a much longer conversation took place.

I need to go back several years. Nelson had been observed by his shipmates to have always opened up a locked cabinet each morning before commencing his duties for the day. He was seen to have consulted a piece of paper, evidently the same piece of paper each day. What was on this paper everyone wondered but were too courteous to ask. Was it a piece of scripture, chosen to give him inspiration as he went about his onerous tasks of ensuring that Britain continued to rule the waves? Was it a copy of his will, a subject that might have been preying on his mind, as he strove to give a fair inheritance to Lady Hamilton as well as to his legal heirs?

On the fateful day in which Nelson lay dying, Hardy knew he had one last chance to find out and he asked his wounded leader: ``My Lord, please tell me, for I have been curious on this matter for nigh 20 years. What is on that paper that you consult each morning?''. Perhaps relieved not to be taking this burden to his grave, Nelson was quite forthright and in his final breaths murmured the answer, before he asked for his dying embrace: ``The piece of paper that I read everyday and on which my whole career has depended says: `Port left; starboard right.' ''

The admiration that Lord Nelson attracted in his lifetime, is no less than the admiration a scientist might receive, albeit amongst a smaller and more discerning group of followers. Alex has received many signs of his own recognition by the mathematical sciences profession, including the Fellowship of the Royal Society of New Zealand.

Some words that were written about the fictitious John Macnab apply with only a change of name to the person we are honouring today.

> ``I tell you what, John Macnab is a very remarkable man, a man in a million, and I'm very much inclined to wish him success.''

I would like to say a few words about the health of New Zealand Mathematics, as I see it, and a prescription for its continued health in the future. We are a small community and cannot, as individual mathematicians with specialist

interests, afford to do anything that is not consistent with the general well-being of the subject as a whole. I remember what it was like to be in a department which has a narrow view of its own role in the scheme of things.

My head of department, the late Professor Keith Bullen, was a truly great scientist and a truly great applied mathematician. However, he maintained destructive enmities with other academics. I was still keeping up research links with Physics and showed Professor Bullen some of my papers in collaboration with Harry Messel, the head of physics. Professor Bullen refused to put these papers in the departments annual report because ``some departments pad their publication list but I don't think we should do that''. Later I worked with another prominent Applied Mathematician, Derick Lawden at the University of Canterbury, and he had no such hostility towards other scientists. The real scandal of the Sydney University situation was the relationship between Professor Bullen and Professor Room, head of Pure Mathematics, or in the terminology of Professor Bullen, of ``formal mathematics''. They couldn't even share a cup of tea together or be in the tea room at the same time. Maybe they could afford this sort of nonsense in a larger country like Australia, but I have doubts about that too. We certainly can't afford this divisiveness in New Zealand.

How do we avoid it? Just refuse to take part in it; live our own mathematical lives as though these divisions are nothing more than technical and administrative conveniences and are nothing intrinsic to the nature of mathematical science. If an ignorant administrator tries to impose structures on us that are not consistent with the good of mathematics as a whole, refuse to cooperate. These people come and go, but the mess they make can last a long time. It is mathematics, rather than sections within it, that have to be preserved.

Alex McNabb has always worked in applications but he still values all parts of mathematics. To call him a great {\em New Zealand Applied Mathematician} is to pay him a tribute that he deserves. But an equally great tribute that he equally deserves is to acknowledge that he is a great {\em New Zealand Mathematician}. It is in this light that he is recognised by the New Zealand scientific community as an FRSNZ. And it is in this light that I am proud to have him as a colleague and a friend.

Amongst the non-mathematical interests that Alex enjoys is gymnastics. He has been a gymnast himself, and a successful competitor, and has also served this sport in other ways throughout his life. Is it fanciful to seek a connection between the nimbleness of mind that lies at the heart of the scientific work that Alex has devoted his life to and the nimbleness of body that comes from this particular sport? At very least, keeping oneself reasonably fit is an aid to doing good mathematics, or to doing good anything else that needs a clear head and concerted mental effort. But why gymnastics? I think that what a person does with his or her life is determined at a more central level than physical or mental prowess alone.

There is something in the essence of Alex McNabb-ness that determines his style in all areas of his life. *Mens funambula in corpore funambulo*---an acrobatic mind in an acrobatic body.

> ``I tell you what, Alex McNabb is a very remarkable man, a man in a million---and I, and all of us, are very much inclined to wish him even further success''.

John Butcher

CENTREFOLD

Dr M K Vamanamurthy

At the end of January this year Associate Professor M. K. Vamanamurthy (Vaman) retired after 28 years on the staff of the Department of Mathematics at the University of Auckland.

Vaman was born in Mysore, India on 5 September, 1934. His University training began at the University of Mysore, from which he completed B.Sc.(Hons) and M.Sc.\ degrees, both with first class honours in Mathematics. Following that he spent several years teaching in Bombay and Mysore before deciding to embark on higher studies. As a Fulbright Scholar he travelled to the University of Michigan in 1964 and there completed a Ph.D. degree as the seventh student of Fred Gehring (the sixth Ph.D. student of Fred Gehring formally completed his degree with his oral examination in the morning of the same day as Vaman completed his so they were really twins!). His thesis, described by his adviser as a ``beautiful thesis,'' was entitled `Quasiconformal Mappings in Space.' As well as teaching at Ann Arbor, Vaman taught at the nearby Eastern Michigan University and Bowling Green University

before returning to India to a position in Madurai.

Vaman arrived in Auckland in 1971, towards the end of a boom of new staff. Lots of us were fresh from Ph.D. programmes, bursting with enthusiasm for teaching and research. Being slightly older than the rest of us Vaman was also more experienced and in those early days he was able to act as a moderating influence on the young Turks when necessary but also encourage us in our research. With respect to the latter, I am sure that my experience is similar to that of a number of others so I will describe it as a kind of prototype. Vaman soon discovered my own research interests and found that they were not so far removed from quasiconformal analysis. He reckoned that some problems in quasiconformal mappings should be able to be solved using topological techniques and he was right. That was the start of my formal cooperation with other mathematicians and thus I discovered this new kind of fun.

This leads us to one rather distinguishing feature of Vaman's mathematical career. Vaman has undertaken research collaboration with no fewer than 24 other mathematicians. While many of these collaborators are colleagues or ex-colleagues from Auckland the group collectively come from 11 different countries. This surely marks him as a rather unusual mathematician. It reflects both his great interest in what others are doing and his recognition that others can contribute to what he is working on. Consequently his work covers quite a range of mathematics, with concentration in two distinct main areas: quasiconformal analysis and point set topology.

The most sustained and successful collaboration of Vaman's career has been that with Glen Anderson of Michigan State University (another of Fred Gehring's students) and Matti Vuorinen of the University of Helsinki. Sometimes he has worked with just one or just the other but more commonly with both. Together they have covered a lot of mathematics, culminating in a long and carefully written book, `Conformal Invariants, Inequalities, and Quasiconformal Maps' (J. Wiley, 1997).

Another consequence of Vaman's enthusiasm is the close connection between the Mathematics Departments of the University of Auckland and the University of Michigan. One manifestation of this connection is the number of talented students who have gone on from Auckland to Michigan to take on Ph.D. degrees: 8 in the past 20 years, at the latest count.

In addition to his research successes, Vaman has also been one of the top teachers in the Department, earning a well-deserved reputation as an excellent teacher. He has always been willing to take on the challenge of teaching the courses that no-one else wanted. As a colleague teaching another stream of the same course he has always been a pleasure to work with.

On 19 November 1999 the Department of Mathematics honoured Vaman on the occasion of his retirement. During the day there was a mathematical conference and this was followed by a dinner in the evening. The mathematical conference featured talks given by eight colleagues, including Glen and Matti, both of whom made special trips to Auckland for this celebration. Other talks were given by another visitor from USA and members of the Department of Mathematics as well as Vaman himself. The talks covered a wide range of mathematical topics but were bound together by the theme that Vaman himself has made significant contributions in all of the areas.

Vaman has made other contributions to the University, including a term as Head of Department. He has been honoured twice by the New Zealand Mathematical Society for his work: he received the Society's Research Award in 1997 and the same year was appointed a Fellow of the Society.

Now that he has retired we see as much of him as before. Those who enjoyed games of badminton with him continue to do so, and I am assured that he is about as vicious on the badminton court now as he was before (how many people found to their discomfort that they were between him and the shuttlecock?). He continues to talk mathematics with us or works in his office. Later in the year at least one group of students will get the chance to enjoy his lectures. Perhaps his wife Ratna is the only one who notices much difference because every day he goes home to lunch with her, something he could not do before.

David Gauld

Centrefold Index

COMPUTING GROUPS?

At Cambridge University in October 1946, Douglas Hartree gave his Inaugural Lecture as Plummer Professor of Mathematical Physics, on ``Calculating Machines, Recent and Prospective Developments and their impact on Mathematical Physics" (CUP, 1947). He had recently written programs in mathematical physics for ENIAC, which was then the only digital computer publicly known to be operating. (The COLOSSUS computers at Bletchley Park were kept totally secret until 1974, and information on them is still restricted.) Hartree emphasized (page 9) the immense variety of uses for digital computers: ``The same machine might be used, for example, for evaluating solutions of differential equations, for finding the reciprocal of a matrix, and for multiple correlation analysis; it is possible that it could also enumerate the 230 space groups, although this would not normally be included in the term `calculation'. "

At the National Physical Laboratory in 1945, Alan M. Turing wrote his epoch-making ``Proposal for Development in the Mathematics Division of an Automatic Computing Engine", a few copies of which were distributed within NPL early in 1946. A reprint in 1972 made Turing's report more widely available, and it was published in the book ``A. M. Turing's ACE Report of 1946, and other papers", edited by B. E. Carpenter \& B. W, Doran (MIT \& Tomash Press, 1986). Eamonn O'Brien pointed out to me that, in the introductory section, Turing explained that an Automatic Computing Engine could be instructed to perform any specific computation by reading a program punched onto cards, and Turing emphasized (page 21, 1986 edition) that ``There will be positively no internal alteration to be made even if we wish suddenly to switch from calculating the energy of the neon atom to the enumeration of groups of order 720" . Eamonn O'Brien also tells me that ``A more detailed proposal for the use of computers in symbolic and algebraic computation was made in an address of M.~H.~A.~Newman (1951), delivered at the Inaugural Conference of the Manchester University Computer. He discussed the possible use of probability testing in determining the groups of order 256."

At the University of Auckland in March 2000, Marston Conder issued the following announcement:

``ENUMERATION OF GROUPS OF ORDER UP TO 2000"

One Millennium-inspired research project involving mathematicians from Auckland and Germany came to a highly successful conclusion last month: the enumeration of the 49,910,529,484 distinct groups of order at most 2000.

The completion of this project marked the culmination of sustained collaborative research spanning two continents and many computers, by three researchers from Germany and New Zealand: Hans Ulrich Besche (Aachen), Bettina Eick (Kassel) and Eamonn O'Brien (Auckland). Dr O'Brien's involvement in the research has been supported by a Marsden Fund grant to himself and Dr Jianbei An and Professor Marston Conder in the Mathematics Department at the University of Auckland.

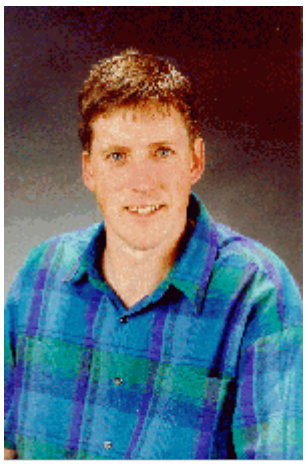
A problem of enduring interest, since foundational work by Arthur Cayley in the 1850s at Cambridge, is the determination of all essentially different groups of a given order. Cayley solved this problem for the groups of order at most 6---there are two distinct groups of each of the orders 4 and 6 and one of each other order. (Cayley somewhat eccentrically changed his mind on the groups of order 6 some 24 years later.) Many mathematicians have sought to extend Cayley's work by hand, and by the early 1980s all the groups of order up to 100 were known.

The advent of high-performance computing in the 1980s provided the framework for the development of procedures (or algorithms) which allow the groups to be enumerated or determined by machine. These algorithms make extensive use of the theory and structure of the groups.

The project reached a happy end-point in February (while Dr O'Brien was visiting the University of London), when the last of the 49,487,365,422 groups of order $2^{10} = 1024$ were enumerated. The groups of order at most 2000 will be accessible to the mathematical community via computer algebra systems, and will provide fertile ground for further research.

Garry J. Tee

NEW COLLEAGUES



Dr Warren B. Moors

Rua Murray

Dr **Warren B. Moors** was recently appointed (July 1999) as a Lecturer in the Dept of Mathematics at the University of Waikato. His research interests are in geometric functional analysis, topology and non-smooth analysis. Warren received his B.Sc. and M.Sc. from the University of Auckland in the late eighties and gained his Ph.D. from the University of Newcastle (Australia) in 1992. Since 1992 he has had held several post-doctoral positions. The most

significant moment in his mathematical life occurred in 1998 when Professor Vladimir Pestov (Victoria University of Wellington) supported him (as a research fellow) under his Marsden Fund grant administered by the Royal Society of New Zealand. For otherwise, he would now be working in a bank wearing a suit and tie.

Rua Murray joined the Mathematics Department at Waikato in July 1999 after five years abroad. Rua was born in Wellington, but spent most of his childhood in Christchurch where he attended Hagley High School for four years, and then Canterbury University. Having arrived at Canterbury without sitting the bursary examinations, Rua recalls initial feelings of trepidation about enrolling in the ``hard'' first-year core mathematics course (Math 104). However, in Rua's young eyes, the combination of excellent tutorial support and inspired lecturing clearly distinguished this course from the first-year offerings of other Canterbury departments. Thus, Rua stuck with Mathematics, and went on to complete an honours degree, developing an interest in the relationship between dynamical systems theory and computation.

In 1994, Rua left New Zealand on a Prince of Wales scholarship to undertake Ph.D. study at Cambridge. He worked in the Statistics Laboratory (DPMMS) under the supervision of Colin Sparrow. Of his time in Cambridge, Rua recalls: ``The academic atmosphere at Cambridge was very different to Canterbury: there was very much a `sink or swim' attitude to graduate students and many of us felt that the odds were on sinking. I was lucky to have been supervised by Colin, who was highly skilled at steering flailing students in the right direction. Of course, the research environment was fantastically rich, with an utterly comprehensive library, many world class mathematicians `just down the corridor', and a steady stream of visitors. So, being a student at Cambridge was an extraordinary experience.''

For his Ph.D., Rua worked on numerical methods for ergodic theory and dynamical systems, and wrote his thesis on rigorous methods for calculating invariant measures for dynamical systems. After completing his thesis, Rua held a one-year position in the Centre for Nonlinear Dynamics and its Applications at University College London. There, he taught part of the Centre's ``M.Sc. in Nonlinear Dynamics and Chaos'', and continued his research in numerical ergodic theory. Rua and his wife Michelle then spent a year on Vancouver Island where Rua worked as a PIMS (Pacific Institute of Mathematical Sciences) Post-Doctoral Fellow, working with Chris Bose at the University of Victoria (Canada).

After nine months, Rua is still pleased to be back in New Zealand. He continues to work actively on ``numerical ergodic theory''---an exciting and burgeoning field at the interface of dynamical systems theory and computation. He is very keen to hear from other New Zealand mathematicians who think this sounds interesting!

BOOK REVIEWS

SPRINGER-VERLAG PUBLICATIONS

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

David Alcorn
Department of Mathematics
University of Auckland
(email: alcorn@math.auckland.ac.nz)

Anderson JW}, Hyperbolic geometry. (Springer Undergraduate Mathematics Series) 230pp.
Baxter Hastings N}, Workshop calculus with graphing calculators Volumes 1 \& 2. (Textbooks in the Mathematical Sciences) 440pp, 425pp.
Beltrami E}, What is random? Chance and order in mathematics and life. 200pp.
Chabert J-L}, A history of algorithms. 524pp.
Chicone C}, Ordinary differential equations with applications. (Texts in Applied Mathematics, 34) 561pp.
Cohen AM}, Algebra interactive! 160pp + CD-ROM.
Durrett R}, Essentials of stochastic processes. (Springer Texts in Statistics) 305pp.
Dyke PPG}, An introduction to Laplace transforms and Fourier series. (Springer Undergraduate Mathematics Series) 248pp.
Ebbinghaus H-D}, Finite model theory (2nd ed). (Perspectives in Mathematical Logic) 360pp.
Eisenbud D (ed)}, Commutative algebra, algebraic geometry, and commutative methods. 300pp.
Elaydi SN}, An introduction to difference equations (2nd ed). (Undergraduate Texts in Mathematics) 470 pp.
Everitt BS}, Chance rules. An informal guide to probability, risk, and statistics. 202 pp.
Flenner H}, Joins and intersections. (Springer Monographs in Mathematics) 307pp.
Golubitsky M}, Pattern formation in continuous and coupled systems. (The IMA Volumes in Mathematics and its Applications, 115) 340pp.
Hsieh P-F}, Basic theory of ordinary differential equations. (Universitext) 500pp.
Kerber A}, Applied finite group actions. (2nd ed) (Algorithms and Combinatorics, 19) 454pp.
Kreith K}, Iterative algebra and dynamic modeling. (Textbooks in Mathematical Sciences) 320pp.
Liggett T}, Stochastic interacting systems: contact, voter and exclusion processes. (Grundlehren der mathematischen

Wissenschaften, 324) 332pp.
Malle G}, Inverse Galois theory. (Springer Monographs in Mathematics) 436pp.
Marsh D}, Applied geometry for computer graphics and CAD. (Springer Undergraduate Mathematics Series) 288pp.
Mumford DB}, The red book of varieties and schemes. (2nd ed) (Lecture Notes in Mathematics, 1358) 304pp.
Nocedal J}, Numerical optimization. (Springer Series in Operations Research) 636pp.
Sastry S}, Nonlinear systems. (Interdisciplinary Applied Mathematics, 10) 745pp.
Schaefer HH}, Topological vector spaces. (2nd ed) (Graduate Texts in Mathematics, 3) 375pp.
Serfozo R}, Introduction to stochastic networks. (Applications of Mathematics Stochastic Modelling and Applied Probability, 44) 330pp.
Zong C}, Sphere packings. (Universitext) 241pp.

Lectures on Modules and Rings
T.-Y. Lam,*Graduate Texts in Mathematics*, 189}
Springer-Verlag, Berlin-New York-London, 1999, 557pp, DM 119.00.
ISBN 0-387-98428-3.

T. Y. Lam is well-known among algebraists for his expository skills and his latest text maintains this reputation. Initially billed as a sequel to his earlier text {\em A first course in noncommutative rings}, published by Springer in 1991, this text is for the most part independent of the first. Indeed, the first concentrates on the internal workings of rings, providing a modern treatment of the classical theory dating back to Wedderburn, Artin and Jacobson. In contrast, his new text emphasises how module structure over a ring can characterize rings. As such, in this reviewer's opinion, it gives a better overview of how ring theory has developed over the last forty years than the earlier text. I chose ``forty'' carefully because it's surprising how much modern ring theory has been influenced by the 1960 paper by H. Bass, *Finitistic dimension and a homological generalization of semiprimary rings* (although I should note that perfect rings, the ``homological generalization'' in Bass' title, are actually introduced in Lam's first volume).

The book begins with a first chapter on the rudiments of homological algebra, namely free modules, projective modules and injective modules, followed by a second chapter on flat modules and homological dimensions. This takes up 200 of the 540 pages. As in the rest of the text, the theoretical material is well illustrated with lots of examples, lots of exercises and lots of remarks referring the reader to related results outside the scope of the book.

The third chapter looks at uniform dimension, CS modules (a.k.a. extending modules and currently very topical), singularity and rational hulls. This is followed by two chapters on rings of quotients, including not only the expected topics of Ore localizations and Goldie rings but also the more recent maximal ring of quotients and, more recent still, Martindale's rings of quotients. (The first three subsections of this chapter are labelled ``The Good'', ``The Bad'' and ``The Ugly'' of noncommutative localization!)

Frobenius and quasi-Frobenius rings are treated in Chapter 6. The treatment here is somewhat more classical than in the other chapters, with references to the early study of these rings by Frobenius (of course), Brauer, Nesbitt, Nakayama and Azumaya. The reader is referred to other texts for more recent or more general treatments, for example, the beautiful Faith-Walker characterization of a quasi-Frobenius ring as a ring R in which every right injective module is projective and also as a ring R in which every right projective module is injective.

The final chapter looks at the equivalence of module categories and Morita theory beginning with the motivational example of matrix rings. Morita equivalence and Morita duality are powerful tools in the study and transfer of module properties that enjoy a more categorical flavour and the author does a fine job explaining them with his mix of theory and example.

It's clear from his exposition that Lam knows and enjoys his subject. The text is strongly recommended to anyone who wants to share this knowledge and enjoyment.

John Clark
University of Otago

The Penultimate Conjecture
by Leonard Michaels, The New Yorker, 1 February 1999, pp. 64--68.

This short story captures something of the otherworldly nature of academic mathematical life and is well worth digging out of your local public library. At a conference we've all been to, the chalk is squeaking and the fabulous Lindquist presents his dazzling proof. But Lindquist sees something he doesn't like in the eyes of Nachman, while Nachman has problems of his own with the unsettling, feral Chertoff. To me, the personalities, the atmosphere, the little neuroses are disconcertingly familiar, as if mathematics is not merely being drawn here but held to account. Read this story, and get your partner to read it, if you dare.

Robert McLachlan
Massey University

Topological Methods in Hydrodynamics

by Vladimir Arnol'd and Boris Khesin, (Applied Mathematical Sciences, 125)
Springer-Verlag, New York, 1998, 390pp, DM 108.00, ISBN 0-387-94947-X.

In the second half of the 20th century, some of the major progress in understanding the hydrodynamics of ideal (and possibly electrically conducting) fluids has arisen from placing the subject within the framework of differential geometry. Such a framework permits many powerful results, particularly conservation properties and stability theorems, to be proved in an elegant manner through use of group-theoretic methods. In addition, the relevant physical quantities (such as vorticity and helicity) and their inherent dynamical constraints are related to the topology of the underlying manifolds and associated spaces.

This book is a research monograph which surveys the main developments of topological methods in hydrodynamics, summarizes the current state of the art, and presents the outstanding unsolved problems in this field.

The six chapters are: I, Group and Hamiltonian structures of fluid dynamics (including I.2 Lie groups, Lie algebras and adjoint representation, I.6 Hamiltonian structure for the Euler equations, I.7 Ideal hydrodynamics on Riemannian manifolds, I.10 The group setting of ideal magnetohydrodynamics); II, Topology of steady fluid flows (II.2 Variational principles, II.3--4 Stability); III, Topological properties of magnetic and vorticity fields (III.7 Generalized helicities and linking numbers); IV, Differential geometry of diffeomorphism groups (IV.4 Diffeomorphism groups and unreliable forecasts, IV.8 Hamiltonian diffeomorphisms and symplecto-hydrodynamics); V, Kinematic fast dynamo problems; VI, Dynamical systems with hydrodynamical background.

The authors have done an excellent job in introducing ideas at a brisk pace, with explanations that are as brief as possible without sacrificing clarity. While much of the development is due to the authors themselves, the literature citations are comprehensive---especially a large body of Russian literature that has not always been accessible to other researchers.

The book is not for beginners: previous knowledge of fluid dynamics and/or differential geometry is essential. Many of the examples would be challenging problems for senior undergraduates or postgraduates. I recommend the book wholeheartedly as a valuable reference text for research purposes.

For a review by N.K. Smolentsev, see Mathematical Reviews 99b:58002.

David Tan
University of Otago

CONFERENCES

2000

June 14--16 (Sydney) **Conference on Mathematics and Computers in Sport**
Contact Graeme Cohen
email: g.cohen@maths.uts.edu.au

July 2-5 (Brisbane) **44th Annual Meeting of the Australian Mathematical Society**
Contact Dr E J Billington (secretary)
email: AustMS2000@maths.uq.edu.au
homepage: http://AustMS2000.maths.uq.edu.au

July 9-15 (Perth) **Conference on Abelian Groups, Rings and Modules**
Contact Phill Schultz
email: schultz@maths.uwa.edu.au

August 9-13 (Hawaii) **Pacific Rim Dynamical Systems Conference**
homepage: www.siam.org/meetings/ds00/

September 10-13 (Melbourne) **The 4th Biennial International Conference of the Engineering Mathematics and Applications Conference**
email: emac2000@rmit.edu.au
homepage: http://www.ma.rmit.edu.au/emac2000/emac2000.html

October 23-27 (Manila, Philippines) **The Third Asian Mathematical Conference**
email: amc2k@math01.cs.upd.edu.ph homepage: http://math01.cs.upd.edu.ph/AMC2000/

November 26-29 (University of Waikato) **2000 New Zealand Mathematics Colloquium**
Contact Ian Hawthorn
homepage: http://www.math.waikato.ac.nz/Coll2000/

December 4-8 (Christchurch) **25th Australasian Combinatorial Mathematics and Combinatorial Computing Conference**
Contact either Charles Semple or Mike Steel
email: c.semple@math.canterbury.ac.nz, m.steel@math.canterbury.ac.nz homepage: http://www.math.canterbury.ac.nz/accmcc.shtml

PRELIMINARY ANNOUNCEMENT FOR THE\\ 2000 NEW ZEALAND MATHEMATICS COLLOQUIUM

The University of Waikato will be hosting the Colloquium in November of this year (rather than July, as in recent years). A full announcement will appear in the August edition of the NZMS newsletter. For the moment, please mark off the dates in your diary:

26--29 November, 2000

Up-to-date information will be available on the Colloquium web site: http://www.math.waikato.ac.nz /Coll2000/. The Waikato Mathematics Department look forward to seeing you all in November!

Rua Murray
Secretary, NZMC2000 Organizing Committee

NOTICES

NZMS VISITING LECTURESHIP 2000

The New Zealand Mathematical Society coordinates and provides some financial support for a tour of NZ universities by a visiting mathematician. Usually this person---known as the NZMS Visiting Lecturer---will spent two to three days at each of the six main university centres, and give at least two lectures at each place: one for a general audience, and one more closely tied to his or her own particular research interests.

Recent NZMS Visiting Lecturers have included John Loxton (Macquarie University), Andreas Dress (University of Bielefeld), Colin Maclachlan (University of Aberdeen), Roger Grimshaw (Monash University), Valerie Isham (University College London), and John Fauvel (Open University).

The 2000 NZMS Visiting Lecturer is Professor John Guckenheimer from Cornell University. He will be an Erskine Visitor at the University of Canterbury from 8 May to 8 June at which time he'll visit the University of Otago. From 8--22 June, John will visit the universities in the North Island. The contact person for his visit is Professor Graeme Wake (University of Canterbury), g.wake@math.canterbury.ac.nz.

NZMS ACCREDITATION

The Society has decided that there will now be Graduate Members, Accredited Members and Fellows of the NZMS. The deadline for applications is Monday May 1st, 2000. If you would like to be considered or would like to nominate someone could you send for application forms to

The Accreditation Secretary
c/- Department of Mathematics and Statistics
University of Otago
PO Box 56
Dunedin

To help you understand better what each of the categories of membership are, I have added a copy of Article IV of the Constitution

Article IV: Optional Accreditation

An Ordinary Member (or Reciprocity Member) may apply to the Council to become a Graduate Member, Accredited Member, or Fellow. The Council shall make and issue, and may revise from time to time, Rules which shall give effect to the following requirements.

1. A Graduate Member shall have completed a degree or diploma at a recognised university or other tertiary institution, the studies for which shall include mathematics as a major component, and shall be currently employed or occupied in the development, application or teaching of mathematics.
2. An Accredited Member shall have completed a postgraduate degree in mathematics at a recognised university or other tertiary institution, or shall have equivalent qualifications, and shall have been employed for the preceding three years in a position requiring the development, application or teaching of mathematics.
3. A Fellow shall be a person who currently has or previously has had the qualifications of an Accredited Member and who, in addition, is deemed by the Accreditation Committee (see paragraph below) to have

demonstrated a high level of attainment or responsibility in mathematics and to have made a substantial contribution to mathematics or to the profession of mathematician or to the teaching or application of mathematics.

An Honorary Member shall have the right to become a Fellow immediately upon application to the Council and without payment of a fee.

The Council shall establish an Accreditation Committee to consider applications for designation as a Graduate Member, Accredited Member or Fellow, and to administer the Rules described in the first paragraph of this Article. In its determinations, the Accreditation Committee shall discount interruptions to employment such as temporary unemployment and parental leave.

A Graduate Member may use the abbreviation GNZMS, an Accredited Member may use the abbreviation MNZMS, and a Fellow may use the abbreviation FNZMS. These designations and the corresponding abbreviations are the rights of that class of Member only while the member remains a financial member of the Society and while the occupational requirements outlined in the first paragraph of this Article continue to be satisfied. The occupational requirements shall be deemed to be satisfied by Honorary Members and in the case of interruptions to employment such as temporary unemployment and parental leave, and they shall not be applied in the case of retirement or promotion to an administrative or other position.

A fee shall accompany each application to the Accreditation Committee. The fee shall be additional to the annual subscription charged by the Society and shall be the only charge for accreditation.

If you have any queries could you please direct them to me at the above address or by email `dholton@maths.otago.ac.nz`.

Derek Holton
Chair, Accreditation Committee

REPORT ON: MATHEMATICS MEETING
Kaikoura, January 7-15, 2000

The annual NZMRI summer workshop was held in beautiful Kaikoura in the South Island of New Zealand. It was very much in the tradition of previous workshops in Huia (1994), Tolaga Bay (1996, 1997), Napier (1998) and Raglan (1999).

The topic for Kaikoura 2000 was ``Computability, Complexity, and Computational Algebra." We were fortunate to have a fine group of speakers, all of whom are world-renowned mathematicians and computer scientists. Each of the speakers gave a series of 1--3 lectures for this workshop, the first two being easily accessible to graduate students. The speakers were Dominic Welsh (Oxford, on Enumeration Complexity, 3 (lectures)), Lance Fortnow (Chicago, on Kolmogorov Complexity, 3), Eric Allender (Rutgers, on Basic Complexity, 3), Hugh Woodin (Berkeley, The Continuum Hypothesis, 1), Mike Fellows (University of Victoria, BC, and Victoria University, Parameterized Complexity, Treewidth, 3), Felipe Cucker (Hong Kong, Real Complexity, 3), Elwyn Berlekamp (Berkeley, Games, 3), Persi Diaconis (Stanford, Randomized Algorithms, 3), Alice Niemeyer (UWA, Computation in Matrix Groups, 1), and Cheryl Praeger, (UWA, Complexity and Computation in Matrix Groups, 2).

The conference proper began on the Saturday and continued till the next Saturday, inclusive. Despite the often inclement weather, we all enjoyed the often excellent and very well prepared lectures. The reporters here were inspired by several of the lectures, and, all the speakers need to be congratulated for their efforts. As is traditional, there was ample time to explore Kaikoura. Whales were watched, seas and dolphins swum with, cliffs admired, latt\'{e}s drunk. Fortunately, the sun came out for the harrowing ascent of Mount Fyffe organized by Charles Semple. No mathematicians were lost, despite some fine efforts.

The number of attendees was an order of magnitude greater than any previous meeting, being over 150 associated with the group, including families. Many graduate students, especially from Auckland, attended, the only disappointment being the few attendees from Otago. On the final Bar-B-Q, we were amazed at the number of countries being represented at the meeting. We were catered for by the local marae which provided good solid tucker, with a true penchant for variations on mashed potato.

Of course we were mainly supported by a generous grant from the Marsden Fund. Some of the invited speakers paid for themselves, and some of the directors and others used their personal grants to help with the costs, as did several mathematics departments. These meetings provide otherwise unavailable opportunities to mingle with, and learn from, some of the best mathematicians and computer scientists in the world.

Next years meeting is in Nelson and is devoted to Operator Algebras. More about this soon.

This year we will be producing a volume based on the lectures given at the meeting. It is to be published by De Gruyter, and should be available this year, or at least early 2001. The preliminary announcement is attached below. If

the writeups are as good as the talks, it will be an excellent addition to your personal, and your department's, library.

Rod Downey and Denis Hirschfeldt

FORDER LECTURER 2001

Dr Tom Korner, Department of Pure Mathematics and Mathematical Statistics, University of Cambridge, has been appointed as Forder Lecturer 2001. He will come in mid-July 2001 for about 4 weeks. Here is the pen portrait he provided.

Dr Korner is a reader at Cambridge University and Director of Studies at Trinity Hall. His research lies mainly in Fourier analysis and particularly in some of the more exotic behaviour of Fourier transforms. One advantage of the choice of this topic is that it is a French speciality enabling him to spend some time working in France. He has published an advanced text on Fourier analysis and a popular text on mathematics called `The Pleasures of Counting'.

His talks include public lectures *How to hunt a submarine*, general talks *Marrying, choosing, voting;Why are we not all called Smith?*; and *From waves to wavelets* and colloquia (*From pollen to the stock exchange* (Brownian motion); *Molehills out of mountains* (analysis); *Rearranging Fourier series*; and *A theorem of Mensov)*.

Departments are asked to give me contacts and to confirm availability of accomodation.

Graeme Wake
University of Canterbury

GRANTEES REPORT

I am grateful to the NZMS for their financial support which has enabled me to attend the 14th Conference of Topology and its Applications at Long Island University, Brookville, New York, USA, August 4--7, 1999, and the International Conference on Topology and its Applications at Kanagawa University, Yokohama, Japan, August 23--27, 1999.

In the New York conference, I presented the paper ``Metrizability of manifolds by diagonal properties". There were 170 participants in this conference. In the Yokohama conference, I presented the paper ``Metrizability of generalizations of developable and M-spaces". There were 160 participants in this conference.

I enjoyed these conferences and the talks presented there very much. Also, it allowed me to meet people, make more friends and discuss my research problems with other mathematicians. I really benefited from participating in these conferences.

In between these two conferences I visited Professor Peter Nyikos at University of South Carolina and we worked some topology problems on manifolds together.

Some of the interesting talks

``Foundation of a computable topology for solid modelling" by Abbas Edalat
Computational geometry and solid modelling are based, on the one hand, on classical notions of topology and, on the other hand, on the RAM (Real Random Access Machine) model of computation. These foundations, which are classically consistent, are both unsatisfactory in any feasible computational framework. In fact, the basic predicates and operations in topology, such as the classical membership predicate of a paper subset of the Euclidean space or the binary operation of intersection of, say, compact subsets, are in general discontinuous and, therefore, non-computable. Furthermore, the Real RAM model is unrealistic since it assumes that comparison of real numbers is decidable in finite time. Consequently, classically correct algorithms in computational geometry and solid modelling, when implemented for actual computation, turn into unreliable programs which can crash. He presented a domain, equipped with its Scott topology, to model the space of solid objects.

`Inductive constructions using finite hulls" by Stephen Watson
He define a topological space X by a simple inductive procedure of length w_1. The actual space described depends on the particular sequence of finite hulls but, for sufficiently large finite hulls, its properties appear to be rather coherent and its structure surprisingly stable. By using appropriate parameters, he could obtained some well-known and useful spaces.

I would, once more, like to thank the NZMS for their generosity and financial assistance.

Abdul Mohamad
University of Auckland

We could see the bays, blue water and the runway of KeriKeri airport far below us. The pilot seemed about to fly

over it when suddenly the plane dived and a couple of minutes later our 15 seater had landed. We were on our way to Waitangi and the ANZIAM 2000 conference. When I say ``we'' I'm talking about myself, my husband Mike and Lara, our one year old daughter. Both Mike and I were attending the conference and giving student talks. My parents rendezvoused with us so that they could look after Lara while we were conferencing. Mike needed some looking after too because he was on crutches with a hole in his foot after a surfing misadventure.

The conference started Tuesday evening, February 8th, with a welcoming powhiri and BBQ at the poolside of the Copthorne Resort. There were about 200 delegates and quite a few familiar faces in that crowd so it was great to catch up with people that I hadn't seen for a few years. Wednesday was a full day of talks starting with an excellent multimedia presentation by Peter Hunter on modelling heart electromechanics and facial expressions of humans. In the afternoon I learnt about ant trails and possums spreading tuberculosis in forests. Mike and I both gave our talks and then we headed back to the bach to see how Mum, Dad and the kid were.

Thursday morning dawned another sunny day. We saw the talk which deservedly won the best student presentation Cherry Prize given by Chris Reid from Massey University on the Duffing twin well oscillator. That afternoon the keen punters headed off kayaking, walking and sailing. Mike was definitely out of action and still taking daily trips to Kawakawa hospital so I opted out in sympathy and spent the afternoon with Lara and Mum and Dad at the beach instead! Friday continued where Thursday left off with more high-standard presentations including a series on Americas Cup-related topics and apparently a talk on formulae which propose to solve everything (unfortunately I missed that one). Andy Philpott became co-winner of the Cherry Ripe prize with his talk on America's cup performance prediction using computer simulation. The Cherry Ripe prize is a chocolate bar (called a Cherry Ripe---only available in the west island) awarded by the students to the best non-student talk. Actually I think my late vote at 7pm tipped the scales for that one but I'm not 100\% sure. The winners of the awards were announced at the conference banquet on Friday evening. And oooh what a meal! We were also treated to a local maori culture group performance which I really enjoyed.

Many thanks to Andrew Pullan and David Ryan and their helpers for the smooth organisation of such an enjoyable and successful conference. My apologies go to David Ryan and the speakers for not attending the Saturday morning talks despite David's strict instructions at the conference dinner to do so!

Many many thanks to the maths department of the University of Canterbury for paying part of my conference fee and to the NZ mathematical Society for donating me $500 towards conference expenses. Without this financial support I would have missed out on a valuable experience.

Britta Basse
University of Canterbury

I would like to thank the NZMS for giving me financial support to attend a conference entitled `Kruskal 2000 Conference on Integrable Systems' in the first week of January 2000.

The conference ran from January 3--7 on the campus of Adelaide University and was in honour of the 75th birthday of Martin Kruskal. Professor Kruskal was the co-discoverer of solitons and as such helped bring about the birth of the field now known as integrable systems. Some of his contributions to other fields of mathematics and physics were discussed during the course of the conference; however, the main topic of discussion was integrable systems.

Many of the speakers were past students and/or close friends of Professor Kruskal and all were of a very high standard. The majority of papers in the conference were on the Painlev\'{e} model of integrability and its ramifications. I gave a talk on `Inverse scattering on graphs and matrices' which was the only paper discussing another of the many other facets of integrability, namely inverse scattering. There were also interesting talks on the symmetry group approach to integrability, solitons in relativity and black holes and (the opposite of integrability) non-reproducibility and computational chaos. The proceedings of the conference will be published in a forthcoming issue of The Journal of the Australian Mathematical Society.

I wish to thank the NZMS, my supervisor and the Department of Mathematics at Auckland University for their financial support which allowed me to attend this conference.

Mark Harmer
University of Auckland

From September 20--24 I was fortunate enough to attend the Computational Techniques and Applications Conference (CTAC) at the Australian National University (ANU), Canberra. I presented a paper titled ``A preconditioned GMRES method for fast fitting of Kriging surfaces'' which is research I'm conducting with my supervisor, Rick Beatson, for my Ph.D.

The conference was rewarding in terms of the interesting talks presented, the opportunity to meet experts in the field, and to meet other Ph.D. students. There were a total of 125 talks by participants from Australia, New Zealand, Asia, Europe and America as well as workshops on data mining, high performance computing, advances in differential equations, and scientific visualisation and virtual environments.

I would like to thank the NZMS and the Department of Mathematics and Statistics, University of Canterbury for their support and giving me the opportunity to attend the conference.

Cameron Mouat
University of Canterbury

MAPLE 6

Maple 6 is now shipping. It is available in a number of platforms including Windows, Macintosh, UNIX, and Linux. There is also a newly redesigned Student Edition and a 30-day trial version of the software. Maple 6 embodies technological enhancements and new functionality that dramatically speeds up complex technical computation projects. The new math engine is the result of a technology partnership between Waterloo Maple and the Numerical Algorithms Group (NAG) in Oxford, UK, and it delivers an extensive set of NAG solvers for computational linear algebra. See `http://www.maplesoft.com/products/Maple6/maple6info.html` for details, and contact HRS Ltd at \verb|maple@hrs.co.nz| for pricing and ordering information.

Ray Hoare
Hoare Research Software Ltd

CORRIGENDUM

LIST OF HONORARY LIFE MEMBERS

In the article ``The First 25 Years of the New Zealand Mathematical Society'' (NZMS Newsletter 76, 30--35), the list of Honorary Life Members (p. 31) should have included A. Zulauf.

Garry J. Tee

APPLICATION FOR FINANCIAL ASSISTANCE

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Announcement

de Gruyter Series in Logic and Its Applications, Volume 4
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Aspects of Complexity

Minicourses in Algorithmics, Complexity, and Computational Algebra
NZMRI Mathematics Summer Meeting, Kaikoura, New Zealand,
January 7--15, 2000
Editors: Rod Downey, Denis Hirschfeldt

2001. 17 x 24 cm. Approx. 250 pages.\\ {\it
USA, Canada, Mexico: Cloth Approx. US\$ 89.95
All other countries:} Cloth Approx. DM 198, oS 1.445, sFr 176,- ISBN 3-11-016810-3

This book contains detailed expositions of the following minicourses, each consisting of a series of lectures, presented to the annual New Zealand Mathematics Research Institute summer meeting held in Kaikoura, New Zealand.

- *Dominic Welsh*, Counting Complexity
- *Lance Fortnow*, Kolmogorov Complexity
- *Eric Allender*, Basic Complexity
- *Hugh Woodin*, The Continuum Hypothesis
- *Mike Fellows*, Parameterized Complexity, Treewidth, and Robertson-Seymour Theory
- *Felipe Cucker*, Real Computation
- *Elwyn Berlekamp*, Games
- *Persi Diaconis*, Random Sampling with Applications
- *Cheryl Praeger* and *Alice Niemeyer*, Complexity and Computation in Matrix Groups

In their diversity, the contributions to this volume give a broad picture of current trends and activities in computational complexity and algorithmics. While the breadth of the material will make the book useful to a wide variety of specialists, the contributors have taken care to make their minicourses accessible to advanced undergraduates.

SITUATIONS VACANT

CHAIR IN STATISTICS---UNIVERSITY OF CANTERBURY

Applications are invited for a Chair in Statistics in the Department of Mathematics and Statistics. This Chair will complement the two existing Chairs in the Department (in Pure and Applied Mathematics). Applicants may be from any field of applied or theoretical statistics. The University is seeking a scholar with significant achievements and initiatives in both research and teaching. Administrative experience and the ability to attract research/consultancy funding are highly desirable. The appointee will have strong leadership qualities and experience in the supervision of doctoral students.

More information about the Statistics Group in the Department may be accessed on the web at `http://www.canterbury.ac.nz`. Enquiries of an academic nature may be made to Professor D. S. Bridges (fax (03) 364 2587).

Full details and Conditions of Appointment are available from: `h.reeves@regy.canterbury.ac.nz`.

Applications, quoting Vacancy No. MT110, close on 16 June 2000 with The Human Resources Manager (MT110), University of Canterbury, Private Bag 4800, Christchurch.

The University has a policy of equality of opportunity in employment.

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Not available online.