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:

The New Zealand Mathematical Society,
c/- The Royal Society of New Zealand,
P.O. Box 598, Wellington, New Zealand.

However, correspondence should normally be sent to the Secretary:

Dr Shaun Hendy
Industrial Research Limited
Gracefield Research Centre
P O Box 31310, Lower Hutt
s.hendy@irl.cri.nz

NZMS Council and Officers

President	Professor Rod Downey (Victoria University)
Incoming Vice President	Associate Professor Mick Roberts (Massey University, Albany)
Secretary	Dr Shaun Hendy (Industrial Research Limited, Lower Hutt)
Treasurer	Dr Rua Murray (University of Waikato)

EDITORIAL

Mathematical Biographies
Where do we come from? Who are we? Where are we going?

Not many mathematicians lead interesting lives. Success, requiring decades of concentration in an abstract realm which is, moreover, not appreciated by the rest of humanity and held suspect even by other scientists, seems to preclude a normal involvement in human affairs, let alone an outstanding one. Where are the mathematicians to rival Richard Feynman or Linus Pauling? Not surprisingly, most maths anecdotes hinge on eccentricity rather than humanity: mathematicians forget their names, can't decide what's 'obvious', and consider spherical cows. Some of the biographies of mathematicians I've read have been, frankly, boring–not only are the lives a bit boring but the authors are often not mathematicians and simply skip over the work itself. Doesn't that defeat the whole purpose? There always seems to remain an

unremarked gap between the subject's work and personal life. In fact, this is a problem with all scientific biographies, *especially* of mathematicians', whose subject is so far out of the realm of everyday life. Perhaps Sylvia Nasar's *A Beautiful Mind* was successful because John Nash's work and personal life impinged on each other more than they do for most of us. Nasar strongly brought this out. So strongly, in fact, that the book was criticized for overemphasizing the supposed link between madness and genius. There must be more to us than that.

These thoughts were prompted by reading *The Honors Class: Hilbert's Problems and Their Solvers* by Benjamin Yandell, following a rave review by John Stillwell in SIAM Review (vol. 44(4), 2002). This book goes a long way towards meeting my objections. Yandell has done a lot of original research and talked to many of the mathematicians involved. He combines many interesting short biographies with summaries of the mathematics. (The interest is partly due to the interesting times, Germany in the 1930s). After reading this book, I still don't understand what class field theory is, but that may not be the author's fault. I then remembered two earlier enjoyable reads, lives of André Weil and of Jean van Heijenoort; I dug out an old review I wrote of them and (employing my sweeping editorial powers) have slipped it into this issue. Instead of the donnish atmosphere of Hardy's *Apology* and Littlewood's *Miscellany* on which I was raised, all quad and oval, the stage of these lives is the whole twentieth century.

If–Yandell aside–biographers won't (or aren't allowed to) include mathematical material, the alternative is to turn to academic histories of mathematics. These works, though, rapidly become so arcane that history becomes just another (inaccessible) speciality. My favourite must be Imre Lakatos's *Proofs and Refutations* (see the recent *Proofs and Confirmations*, on the alternating sign conjecture, for more on the title) but, more recently, the monumental *Emergence of the theory of Lie groups* by Thomas Hawkins, though hard going, comes close. He really tries to get at the roots of where the ideas came from and why they arose. Jordan 'proved' that all matrices can be diagonalized; the known counterexamples not considered significant, since they only concerned 'special' values of the entries of the matrix. As late as 1927 Felix Klein was praising this 'generic' approach to mathematics. By contrast, the obscure Wilhelm Killing discovered Lie algebras independently of Lie and set out to classify them, doggedly including every nongeneric case. He died unhappy because not only was the classification unfinished–it is still unfinished today–he hadn't even started on what he considered his main problem, to classify all Lie algebra actions and hence, in his view, all possible geometries.

In the words of the citation for the 2001 Whiteman prize won by Hawkins, this book "displays to the full Hawkins's deeply held belief that mathematical understanding grows when the underlying motivations and the original, informal, intuitive conceptions are uncovered and illuminated. It also interweaves the critical human dimension into the story through extensive quotation of the mathematician's private correspondence." So I think now I've argued myself into a corner. There is great material out there after all; people like Yandell and Hawkins are bringing it to us, and others (as in this citation) also sense the need for a synthesis. It just happens to be very, very difficult to achieve.

Robert McLachlan
Massey University

PRESIDENT'S COLUMN

As you all know, a good mathematical friend of New Zealand, Bernhard Neumann passed away on the 21st October, 2002. We knew Bernhard not just through the legend, but because of his openness, friendliness, and mathematical vigor which lasted till the end. Personally, I remember he interviewed me for my first real job for a lectureship in Singapore, and I recall that much of the interview was devoted to red wine. There is a nice article about him in the Australian Mathematical Society Gazette, March Issue. He will be greatly missed.

The positive impact of the NZIMA is being felt throughout New Zealand, with another round of funding having gone through. Details will be found elsewhere in the Newsletter. I wonder if students appreciate the remarkable opportunities they are having with so many meetings, scholarships and programmes available. Details of meetings in January and February 2004 will be found also later in the Newsletter. It will be interesting to see the impact of a similar CoE operating in Australia.

The other major item affecting at least the tertiary institutes is the PBRF. I cannot, at this stage, foresee the consequences of this for mathematics. Given the general excellence of mathematics within New Zealand, my hope is that it will be relatively benign to us.

Council News:
The fact that there is no Colloquium this year may have some effect on the annual general meeting and election of officers. The council will be in touch about this. The council has decided to support the initiative of the Royal Society to have a formal occasion where the winners of annual awards (in our case the Research Award and the Aitken Prize) of the constituent societies will be honoured in one place.

Details are still being worked out. It is anticipated that this will be in around November.

Over the last 20 years there have been a series of predictions of shortages of mathematicians. Ever since Euclid, I am told standards have been falling. (Have you ever actually looked at what they taught in the 50's?) However, there really does seem some cause for concern for New Zealand in a global market for teachers, academics, statisticians, the mathematically trained teachers. It seems that there are growing shortages. This is food for thought, for our planning in the next few years and for advice we are giving students.

Rod Downey
Victoria University of Wellington

PRESIDENT'S REPORT 2001-2002

This report covers the period from the last AGM in December 2001 till December 2002. It seems to me a good time to reflect on the changes in the mathematical landscape in New Zealand since the formation of the Society. Much has changed. Many things are very positive for mathematics in New Zealand, a tribute to the high quality of mathematical research in New Zealand.

Visiting Lecturers
Since this was the 25th anniversary year, it was decided to have two visiting lecturers.

    i. **NZMS Visiting Lecturer(s)**
       The decision was taken at the last council meeting to commemorate the 25th anniversary year by having two NZMS visiting lecturers. They were John Butcher of The University of Auckland and Jim Geelen from the University of Waterloo. Both lecturers gave fine series of talks, and we thank them.

    ii. **Forder Lecturer 2003**
       The 2003 Forder Lecturer for 2003 will be Caroline Series of the University of Warwick. The British Council, which has previously supported this activity has declined to support Professor Series. The LMS is committed to this scheme and is looking into the matter for future lecturers. Shaun Hendy is organizing Professor Series visits, and you will be hearing from him soon. Professor Series is noted for her presentations, as we look forward to an exciting visit.

(Sir) Vaughan Jones
Two wonderful events this year were Vaughan's being made an honorary member of the LMS and of course his becoming a Distinguished Companion of the New Zealand Order of Merit. We extend congratulations to Vaughan, and thank him for his unwavering support of NZ mathematics. Sadly, Vaughan's father died in November this year. We also extend our condolences at this loss.

Membership
Membership is now 235. This is down a little from 249 last year. We also have one new Fellow of the NZMS and an accreditation to be presented at the Colloquium.

NZMS Research Award
The 2001 award went to Warren Moors. The 2002 award will be announced at the NZMS dinner at the Colloquium. We would ask that more people be nominated for this award. We thank this year's committee of Mike Steel, Gaven Martin and Vernon Squire who assist with the selection process.

Aitken prize
The 2001 Aitken prize for the best student talk at the 2001 Colloquium was

    Brian van Dam (Auckland)
    "The construction method of resolutions and Dowker spaces"

Additionally there were four highly commended talks:

    Nicolette Moir (Auckland)
    "A new 'fifth' order method for solving ordinary differential equations"
    Patrick Rynhart (Massey)
    "Mathematical modelling of granulation" Will Wright (Auckland)
    "Some practical general linear methods" Shona Yu (Massey)
    "Zeros of chromatic polynomials and broken wheels"

Thanks to the committee of David Gauld (chair), Peter Fenton, Mick Roberts and Gillian Thornley who made these fine selections from a very good range of student talks.

Math Olympiad

New Zealand also did well at the Math Olympiad obtaining its highest ever placing of 34th out of 84, and its first ever gold medal to Simon Marshall of Onslow College, Wellington. There are a dedicated group of people involved in this, lead by Michael Albert of Computer Science in Otago. The council has voted to commit to supporting this each year in the future.

Royal Society of New Zealand
The RSNZ has had a number of changes in its relationship with its constituent bodies. Shaun Hendy has represented the NZMS in several discussions. Professor Andy Philpott has been elected to the Council of the Royal Society of New Zealand to Chair the Mathematical and Information Science and Technologies Electoral College. Congratulations to Graham Weir and Robert McLachlan for their election to the Fellowship. Robert is also to be congratulated on his personal chair.

NZMS Grants
Council made the following grants in 2001--2:

  i.   Student grants $2000 (4 grants).
  ii. Maths Colloquium 2001 $2500 (NZMS Speaker $1500, student support $1000).
  iii. Approximation theory conference $400 (Rick Beatson).
       Topology Conference $400 (David Gauld).
  iv. NZ Journal Mathematics $1000 (inclusive of arrears–see treasurer's report; another $1000 has been paid for 2002-3 year).
       TOTAL $6300

Investments
After a lot of discussion last year, the council, particularly through the efforts of Rua and Robert looked at many options for more aggressive investment. After due consideration, in the end, given the world situation, it was decided to continue with the previous more conservative investments. We expect this will continue until world markets recover. Rua will speak to this at the AGM.

Centre of Research Excellence
This year there was the exciting news that there have been the formation of two CoRE's of relevance to the NZMS.

One was the NZIMA headed by Vaughan Jones and Marston Conder, as directors, and with a large group of New Zealand mathematicians on the governing board. Funding for 2003 was provided to the following programmes:

> Numerical methods for evolutionary problems (John Butcher, Auckland)
> - middle part of 2003,
> Phylogenetic genomics (Mike Steel, Canterbury)
> - first half of 2003,
> Logic and computation (Rob Goldblatt, Wellington)
> - late 2003 and early 2004,
> Modelling cellular function (Nicolas Smith, Auckland)

Partial support in the form of $100,000 for scholarships was provided to

> Industrial mathematics (Robert McKibbin, Massey at Albany)
> - second half of 2003.

There are two visiting Maclaurin fellowships
David Evans (University of Bristol), first half of 2003 and Richard Laugesen (University of Illinois at Urbana), first half of 2003. The inaugural Maclaurin Fellows is Rod Downey Victoria University (2003).

There are four PhD scholarships, $20,000 in small grants to support meetings, and finally a grant of $10,000 to assist with expenses in training and sending a New Zealand team to the 2003 International Mathematical Olympiad (IMO).

The Allan Wilson Centre for Molecular Ecology and Evolution is also hosting programmes of interest to our members in 2003+ including the phylogeny meeting in Kaikoura.

When combined with the NZMRI meetings in New Plymouth January, 2003 and Nelson, 2004, this indicated great opportunities for mathematics in the next years!

We are also pleased to see that Victoria in Australia has recently decided to begin such a Centre.

Australian-NZ Mathematical Societies and ICIAM 2003
We continue to cooperate with the Australian Mathematical Society. As our annual Colloquium for 2003

will be embedded into ICIAM, the Council urges all of its members to attend. While ICIAM is an applied mathematics conference, the organizing committee has made sure that there is a wonderful pure mathematics stream with a stellar group of speakers. The speakers include Charles Feffermann, Hillel Furstenberg, Hendrik Lenstra, Cheryl Praeger, Wilfred Schmidt, in addition to the 27 ICIAM speakers. We have set aside special monies for grants in aide for Society members to attend with special priority given to students. (The council has decided to increase the potential student support to $1000, subject to numbers.)

Have a look at the site

http://www.austms.org.au/iciam2003/

Israel Mathematical Society-New Zealand Mathematical Society
Following discussions with Vitali Milman, president of the Israel mathematical society, we will be having an International meeting based around the societies in Wellington, early February, 2004. Current plenary speakers include

> Ran Raz (Weizmann Institute),
> Victor Palamodov (Tel Aviv University) and
> Janos Makowsky (Technion) on the Israel side and the New Zealand plenary speakers are
> being determined.

There are a number of Israeli mathematicians planning to attend, so this is quite an exciting initiative.

Chile
Chile is rather strong in mathematics, and is seeking to establish connections with New Zealand. They have a center of research excellence in mathematical modelling, and a both an economy, and a science funding system similar to ours. I have had discussions with Eric Goles who occupies a position similar to a minister of Science in Chile (president of CONICYT and he's a mathematician!), and we will be planning some exchanges and joint meetings, perhaps, along the lines of the Israel one. I plan to pursue this in the coming year. Stay tuned.

Special Thanks
Council members Bill Barton, Robert McLachlan, and Graeme Wake are finishing their terms after sterling service. Thanks to them. I personally wish to especially thank Graeme for his help with matters presidential. While he is staying on council, Charles Semple is stepping down from being secretary. Again thanks for all his work in that capacity.

Rod Downey
Victoria University of Wellington

LOCAL NEWS

AGRESEARCH

The Genstat conference in Western Australia was attended by five AgResearch biometricians, comprising 80\% of the South Island biometricians plus Zaneta Park-Ng as the representative of the smaller northern isle. Busselton, on the coast south of Perth, was a very pleasant venue, and the 80 attendees had a great time, being stimulated scientifically by the varied talks and socially by local entities such as humpback whales, wineries and even a solar eclipse. David Baird was an invited speaker, talking on "Updates to the Genstat spreadsheet and data manipulation in Release 6" and "Using Genstat for microarray analysis." Peter Johnstone talked on "A procedure to randomly generate 1 and 2 dimensional designs for blocks of natural size," Roger Littlejohn on "A Genstat procedure for population genetic data analysis" and Dave Saville on "Multiple comparison procedures: consistency and family-size robustness." After the conference David Baird took off to work on GenStat at VSN in England over the summer, also stopping off in Bangladesh, China and Korea on the way.

Benoîit Auvray has started a two year appointment working with Ken Dodds (biometrician at Invermay) on linkage disequilibrium mapping of quantitative traits in sheep. The project is funded by Ovita and he is based at Invermay. Benoîit comes from Belgium and has a background in computing for animal breeding applications.

Gwenda Hill, who is Head of Mathematics at The Taieri High School, has a Royal Society teaching fellowship and is working with the Invermay biometrics staff this year. She has been teaching for 28 years and is enjoying the opportunity to observe some of the applications of statistics. The CAST program, written by Doug Stirling, is one of the things that Gwenda is interested in studying, with a view to writing guidelines so that this interactive program can be used in secondary schools. Gwenda was an inaugural recipient of the Jim Campbell Award presented by the NZ Association of mathematics teachers and the

NZ Mathematics Society for Excellence in Teaching. Last year she had a book published. This book, "Units in Maths," is designed for students who need basic arithmetic skills development and helps them earn credits towards their National Certificate of Educational Achievement (NCEA) and National Certificate of Employment Skills.

The AgResearch Statistics/Bioinformatics group's annual 3-day "get-together" will be in April at Ruakura. This is an occasion for discussing issues of mutual concern, organising fresh initiatives, giving morning talks to each other, and meeting newcomers such as Katarina Domijan (see photo), Benoît Auvray and Gwenda Hill. As part of the meeting we will attend the workshop by Trevor Hastie on "Popular Methods for Supervised Learning" (http://www.stats.waikato.ac.nz/hastie_workshop.html) which also will be held at Ruakura.

Mick Roberts has left AgResearch to take up a position as Associate Professor of Mathematics on the Albany campus of Massey University. All the best for your new position there Mick!

Ken Louie has transferred from the Grasslands campus (Palmerston North) to Ruakura (Hamilton) and is currently enjoying the wonderful Waikato (ask me again after a few pea-soupers during winter though...) He has also taken over as the AgResearch correspondent to this newsletter. Thanks to Mick Roberts for filling this post over the past few years.

Ken Louie

THE UNIVERSITY OF AUCKLAND

Department of Computer Science

Professor Jim Goodman, from the University of Wisconsin, has started in the Department of Computer Science. He has a distinguished international reputation as a leader in computer architecture. He was instrumental in building and shaping the Computer Science Department in Wisconsin, and he is a strong supporter of building a dynamic graduate programme. After he had accepted the appointment as Professor in our Department of Computer Science, he was astonished to discover that his great-great-grandfather's brother William Steadman Aldis was the first Professor of Mathematics and Mathematical Physics at Auckland University College, from 1884 to 1893. For information about Professor Aldis, consult the paper by Garry J. Tee on 'Professor and Mrs Aldis: mathematics, feminism and astronomy in Victorian Auckland', Southern Stars, Vol. 38 No. 1, September 1998, 18--27. Dr Vinton Cerf, one of the creators of the Internet, gave a public lecture in Auckland in February, providing a rare opportunity for the community to hear from that renowned American scientist. Dr Cerf co-designed the Transmission Control Protocol/Internet Protocol (TCP/IP), which enabled the Internet creation, and he is now helping NASA build an interplanetary version of the technology. His visit was sponsored by the Knowledgewave Trust and The University of Auckland, with his travel expenses supported by the US Embassy. In the middle of March, all members of the Department shifted into floors 3, 4 and 5 of the new extension to the Science Centre, and some members of the Departments of Mathematics and of Statistics shifted into other floors. There is now much more computing laboratory space than in the previous building. Workmen are still continuing to install the plumbing, the cement work, the carpentry, the wiring, the locks, the bookshelves, the window shades et cetera et cetera.

Seminars

Professor Reinhard Klette, "Combinatorial results on incidence pseudographs".

Professor Gerald Sommer (Institut für Informatik und Praktische Mathematik, Kiel), "Pose estimation of 3D free-form contours in conformal geometry", and "Monogenic signal and Poisson scale-space".

Cristophe Diot (Sprint), "Measurement effort at Sprint: performance data from AS 1239".

Neal Glew (Intel Corporation), "Open runtime platform: flexibility with performance using interfaces".

Dr Yejing Wang (University of Wollongong), "A survey of traitor tracing".

Professor Dan Nicolau (Swinburne University of Technology), "Nanomechanics of protein molecular motors - an(other) opportunity for biocomputation?".

Dr Vinton Cerf (WorldCom), "The Internet: its future and the opportunities it presents".

Mark Moir (Sun Microsystems Laboratories), "Non-blocking memory management support for dynamic-sized data structures".

Gill Dobbie, "Know your data: correctness and semantics".

Dr Lindsay Groves (Victoria University of Wellington), "A formal approach to program evolution".

Professor Hideo Saito (Keio University), "Analysis and synthesis of multiple view movie by computer vision-based approach".

Robert Amor, "Construction IT challenges for computer science".

Garry J. Tee

Department of Engineering Science

Martyn Nash, one of our BE and PhD graduates, has returned to the department (and the Bioengineering Institute) as a Lecturer. For more details see the New Colleagues section later in this issue.

Andrew Pullan has been awarded a James Cook Research Fellowship, and so for the next two years he can forget about teaching and concentrate on his research. David Ryan has received the IFORMS prize for teaching and the IFORS Lecturer Award for 2002.

We have two visitors spending a couple of months with us, namely David Schaeffer from the Department of Mathematics, Duke University and Michael Mortell from the Department of Applied Mathematics, University College Cork. Each is teaching a module of Mathematical Modelling 4 on "Stability and bifurcations" and "Financial mathematics", respectively. David is working with Ian Collins on problems involving granular flows, while Mick is an aerodynamicist visiting Mike O'Sullivan.

Don Nield

Department of Mathematics

Dr Hannah Bartholomew has been appointed as Lecturer in the Mathematics Education Unit, and she is due to arrive on April 18.

Warren Moors arrived from Waikato University on January 1, and he is now a Lecturer here. Glenn Bryant is our Teaching Fellow for 2003.

Paul Bonnington has been appointed Associate Dean (for Information Technology) in the Faculty of Science. Tsukasa Yashiro has been awarded a Post-Doctoral Fellowship by the Japan Society for the Promotion of Science. Tsukasa will take up his fellowship in Osaka later this year. Marston Conder attended the musical ceremony at ANU on December 13, commemorating Bernhard Neumann.

Several senior members of the Department have moved into the very confused conditions on Floor 2 of the new extension to the Science Centre. Dr Primoz Potocnik, from the University of Ljubljana, is visiting from 2003 February 10 until April 15. He will be teaching the first half of Maths 328. Dimitrios Antoniou FRCS is a surgeon, who is helping establish a Department of Mathematics and Human Physiology at the University of Ioannina, Greece. He is visiting for six months to study dynamics with Chris King, including the Maths 745 reading course.

Recent visitors include Professor Jon Alperin (University of Chicago), Professor Len Bos (University of Calgary), Professor Kevin Burrage (University of Queensland), Professor Thomas Branson (University of Iowa), Professor Harry Dym (Weizmann Institute), Professor Paul Fong (University of Illinois - Chicago), Professor Kengo Hirachi (University of Tokyo), Dr Zdzislaw Jackiewicz (Arizona State University), Professor Mike Newman (ANU), Dr Pawel Nuroski (Uniwersytet Warszawski), Professor Jorn B Olsson (University of Copenhagen), and Professor Michael Vaughan-Lee (Oxford University).

Twenty people attended the 6th Devonport Topology Festival on Friday 2003 February 21, including two from Waikato and two overseas visitors. Paul Bonnington gave an invited talk "Toroidal triangulations are geometric", and talks were contributed by nine other attendees. For the first time grey weather discouraged the lunchtime swimmers, but the cricket and table tennis were pursued as enthusiastically as ever. In the evening, the participants were joined by partners for dinner on the deck.

We took advantage of the presence of three visiting algebraists to hold a series of lectures on February 13:

Professor Jon Alperin (Chicago), "Navarro's McKay correspondence",

Professor Mike Newman (ANU), "Cayley's general problem",

Professor Michael Vaughan-Lee (Oxford), "Counting p-groups",

Professor Gaven Martin, "The arithmetic groups having presentation $<x, y : x^p = y^q = [x,y]^r = ...>$".

From August 2002 to February 2003, Colin Fox visited the Centro de Investigacion en Matimaticas (CIMAT, {www.cimat.mx) in Gunajuato, México, as Investigador Titular "*A*". CIMAT is one of about 30 federally-funded research institutes that are outside México's university system. CIMAT looks after the mathematical sciences with research groups in Basic (Pure) Mathematics, Computer Science, and Probability and Statistics. It also has a strong PhD program, and most groups contribute to the undergraduate degree at the nearby University of Guanajuato. Like all well-funded research institutes, CIMAT has about the same number of support staff as researchers. It has stunning views, and has its own hotel in a beautiful colonial hacienda, that is free for visiting scholars. In December 2002 Colin Fox attended the Acoustical Society of America's annual conference, in Cancún on the Mexican Carribean. David Gauld attended the NZMRI workshop, in New Plymouth from January 4 to 12. In February, Gaven Martin was an honorary Italian (!) at the "Trilateral workshop in Analysis" between Australia/Italy /Taiwan, delivering a plenary address on holomorphically parametrised isotopies. In March, Gaven's James Cook Fellowship was extended for a year; and in April/May he'll be a Visiting Professor at the Princeton Institute for Advanced Studies. His recent book with Iwaniec was given a Featured Review by the AMS–thus it was judged by them to be one of the top 100 important mathematical publications (not just books) for 2002. Arkadii Slinko is currently on sabbatical leave, visiting the Central Institute of Mathematics and Economics of the Russian Academy of Sciences in Moscow, and the Moscow Independent University. He gave a colloquium lecture on "Ranking Committees, Words, or Multisets" in that Institute, and he will speak in the GLOBUS seminar at Moscow Independent University in May. Arkadii will spend April in France, first visiting the University of Caen for cooperation with Vincent Merlin and Dominique Lepelley, and he will give a colloquium lecture. On the way back he will spend two weeks in Paris visiting Université de Paris 1 Panthéon-Sorbonne, where he will be visiting Bernard Monjardet and he is scheduled to speak at the seminar "Discrete Mathematics and Social Sciences" on April 28. He and Geoffrey Pritchard (Statistics) have just finished a paper "On the minimum average size of manipulating coalition". Sanka Liyanage has successfully defended his PhD thesis in Mathematics Education and has been awarded the degree, subject to "making specified minor corrections to the thesis to the satisfaction of" his supervisor. He is currently employed as a mathematics teacher at McLean's College. Sanka is probably the first Maldive Islander to become a Doctor of Philosophy in Mathematics. Will Wright is now at the University of Oslo whilst his examiners were at The University of Auckland, communicating by teleconferencing. The technician operating the link disappeared off-screen - but the viva voce examination continued, and the examiners recommended that Will be awarded a PhD for his thesis on numerical analysis, subject to minor amendments.

Louise Parsons, who graduated as MSc from this Department, has recently completed her PhD in the Department of Mechanical and Aerospace Engineering at Cornell University, with a dissertation on "Low-Dimensional Models of Near Wall Turbulent Flows Over Compliant Surfaces".

On March 20 the Australian Minister for Education, Science and Training announced that 24 outstanding researchers have been awarded the Commonwealth Government's prestigious 2003 Federation Fellowships, totalling 34.8 million dollars. In particular, Kevin Burrage (now at the University of Queensland) has received a Fellowship, for his project on "Stochastic Modelling of Genetic Regulatory Networks".

Seminars

Professor Paul Gartside (University of Pittsburg), "Universal functions and metrization".

Dr Hannah Bartholomew (King's College London), "Meeting the needs of individuals: some dilemmas and tensions from individualised mathematics classrooms".

Dr S Rauch-Wojciechowski (Linköping University), "From Jacobi problem of separation of variables to theory of quasi-potential Newton systems".

Professor Harry Dym (Weizmann Institute), "Reproducing kernels and inverse problems".

Professor Jorn B Olsson (University of Copenhagen), "Generalized blocks and symmetric groups".

Professor Kengo Hirachi (University of Tokyo), "Q-curvature in conformal and CR geometries".

Professor Jonathan Alperin (University of Chicago), "The stable equivalence problem".

Dr David Evans (University of Bristol), "Beaches, barriers and balls from Stokes through Stoker to the present day".

Professor Gordon Mason (University of New Brunswick), "Nearrings of group endomorphisms".

Brian van Dam, "A non-metrisable manifold from resolutions", and "Prüfer-type manifolds as illustrated by resolutions".

Professor Shamil Galiev (Mechanical Engineering), "The theory of nonlinear trans-resonant wave phenomena, and examination of Charles Darwin's earthquake reports".

Dr Primoz Potocnik (University of Ljubljana), "Regular covers of graphs and their symmetries".

Professor William Duke (UCLA), "Reciprocity laws, elliptic curves, and the Riemann Hypothesis".

Dr David McIntyre, "Characterising continuous functions on compact spaces".

Dr Stephen Coleman (Civil and Environmental Engineering), "Waves in submerged particulate beds".

Dr Pawel Nuroski (Uniwersytet Warszawski), "An analogy between second order ODEs and 3-dimensional Cauchy-Riemann structures".

Dr Jiling Cao, "Volterra spaces revisited".

Garry J. Tee

Department of Statistics

Megan Jowsey (Head of Mathematics at Birkenhead College) is the 2003 Teaching Fellow. Professor Keith Worsley (McGill University) is visiting for March and April, including a tour of several Indian cities as the 2003 Mahalanobis Lecturer. Dr Andrew Balemi is employed (on a short-term contract) as lecturer. Recent visitors include Professor Brant Deppa (Winona State College, Minnesota), Dr Robert Easterling (SANDIA Corp.) and Professor Robert Gentleman (Harvard).

Several members of the Department have moved into the confused conditions of the new extension to the Science Centre. The lecturers teaching Stage One courses in Statistics have received a Distinguished Teaching Award.

Seminars

Professor David R Brillinger (Berkeley), "Risk Analysis in geoscience and remote sensing".

Dr Mark Clements (ANU), "Lung cancer mortality prediction using multi-state population smoking models".

Dr Seisho Sato (The Institute of Statistical Mathematics, Tokyo), "e-decomp and parallel environment for R or S".

Dr Junji Nakano (The Institute of Statistical Mathematics, Tokyo), "Jasp: An e-statistical system using Java technologies".

Dr John M Chambers (Lucent Bell Laboratories), "Who will use statistics? Making statistical software available".

Dr Bryan FJ Manly (Western EcoSystems Technology), "Tests of bioequivalence with non-normal distributions and unequal V".

Professor Kavita Ramanan (Carnegie-Mellon University), "Analysis of an optimal scheduling discipline for telecommunication networks".

Dr Yoshihiko Maesono (Kyushu University), "Asymptotic distributions of *U*-statistics".

Dr Daryl J Daley (ANU), "Modelling long range dependence and point processes".

Professor Trevor Hastie (Stanford University), "Independent component analysis by product density estimation".

Dr Robert G Easterling (SANDIA Corp.), "Statistical foundations for the validation of computer models".

Professor Keith J Worsley (McGill University), "Heritability random fields".

Garry J. Tee

UNIVERSITY OF CANTERBURY

Department of Mathematics and Statistics

The department welcomes Dominic Lee from Singapore who has recently arrived with his wife and two children. Dominic is about to begin a lectureship in Statistics here at Canterbury.

The department also welcomes Wim Hordijk who will be a postdoc with us for the rest of this year. Wim is originally from Holland, but has spent several years recent years on postdocs around the world - including the Sante Fe Institute, and most recently in Brazil. He has also been a mountain-bike guide in the US and involved in search and rescue. Wim's postdoc is funded by the Allan Wilson Centre.

Douglas Bridges is in Munich for a year, as a DAAD Gastprofessor at Ludwig-Maximilians Universität. He will be teaching three courses in the International Masters Programme there: one on Constructive Analysis, one on Foundations of Constructive Mathematics, and one on Numerical Analysis for Computer Scientists. He'll also be continuing his research programme with Peter Schuster, Hajime Ishihara, and (when she joins them for five months in April) Simona Vita.

Seminars

Johannes G Maks (Delft University of Technology), "Flats in *PG*(9,2) which are external to the Grassmannian of lines in *PG*(4,2)".

Professor Nigel Cutland (University of Hull), "A survey of nonstandard techniques and applications in fluid mechanics".

Professor Phillippe Toint (University of Namur), "The filter idea and its application to the nonlinear feasibility problem".

Professor Greg Reid (University of Western Ontario), "Numerical Jet Geometry".

Robert Ware, "Three studies in numerical methods for statistical approximation".

Associate Professor Chris Triggs (The University of Auckland), "Statistical Problems in Forensic Science".

Professor Randy Eubank (Texas A& M University), "Prediction Using Functional Regression Analysis".

Professor Satish Iyengar (University of Pittsburgh), "Models for integrate-and-fire neurons".

David Elliott (University of Tasmania), "Sigmoidal - Trapezoidal Quadrature".

Associate Professor Margaret M Wiecek (Clemson University), "Convex Cones to Aid Decision Making in Multi-criteria Programming".

Rainer Löwen (Technische Universität Braunschweig), "The 'oval conjecture' for planar partition surfaces".

Wim Hordijk, "Dynamics, Emergent Computation, and Evolution in Cellular Automata".

INDUSTRIAL RESEARCH LIMITED

Applied Mathematics Team

Shaun Hendy now has a joint position with IRL and the MacDiarmid Institute at the School of Chemical and Physical Sciences at Victoria University. One quarter of Shaun's time will be at Victoria, involving some teaching and supervision of graduate students, and research for the MacDiarmid Institute for Advanced Materials and Nanotechnology.

Shaun and Graham Weir attended the Maths Colloquium in Auckland in December. Graham gave a talk on "Newton's Coefficient of Restitution" and Shaun talked about "Modelling the Growth and Structure of Passive Films on Metals". Shaun also attended AMN-1 in Wellington. This was a conference on Advanced Materials and Nanotechnology that was organised by the MacDiarmid Institute. Shaun gave a talk on "Molecular Dynamics Simulations of Lead Clusters" and presented two posters.

Two German students joined us on March 3 as part of the practical semester for their degrees. Eva Kasier and Adrijana Juricev are both from the the University of Applied Science in Stuttgart and will be with us for another four months.

Finally, David and Peggy Schaeffer visited us on the 11--12th of February. David Schaeffer is professor of Mathematics at Duke University in North Carolina.

Shaun Hendy

MASSEY UNIVERSITY

Institute of Fundamental Sciences
(Palmerston North)
Mathematics

Here at mathematics we have a circus the whole year round. While we were still processing the Semester 2 examination results, the first assignments for Semester 3 rolled in. In Semester 3 we offered three papers extramurally at one hundred level. All staff were involved in some way. We introduced a roster system and the person on duty dealt with the inquiries for all papers. A special e-mail address was created for the Semester 3 courses. This scheme worked very well so that all staff could spend some time doing some research and attending conferences. Again when these 3rd Semester exam results were being processed Semester 1 had started. Now we are half way through Semester 1 and are looking forward to the Easter 'break'. Again not much of a break for most of us since the four days before Good Friday are devoted to the extramural contact courses. However, one consolation prize is the lunch with the extramural students kindly provided by the Institute. These informal gatherings are very successful and fruitful as students can discuss their options, getting instant replies to their questions and meeting the staff involved in the papers they may wish to take.

It has become evident that the offering of these three 100 level papers in Semester 3 does not influence the number of enrolments in the other semesters which of course is very encouraging.

It is unfortunate that hardly any of us could make it to the Colloquium held in Auckland. We were still finalising the examination results and Semester 3 had been in full swing for a month. Please, colleagues in Auckland, do accept that there were no hard feelings against you. We simply could not close the circus down. We ran two on-campus courses that started on the Friday after the Colloquium. These required preparations like setting a test and getting the appropriate notes out. And of course the piles of hand-outs students expect. Also, the final examinations were almost due before the Semester 3 courses had hardly started!

This semester we are running a bridging paper "Foundation Mathematics and Statistics" as part of a Certificate of University Preparation for students who do not have University Entrance. This complements the paper (and Certificate) already offered at this level for students who have not previously studied through the medium of English. Since we already teach foundation papers for credit in our regular degree programmes, we seem to be directing more and more of our effort into teaching material that is also covered in fifth and sixth form mathematics. The teaching of the Certificate papers is being contracted out to part-time staff, the newest appointee being Robin Rutherford who is teaching the new paper. There are 60 students instead of 20 as expected and planned for, which has caused all sorts of stresses and complications for Robin (including a trebling of her teaching hours), but nevertheless she is finding the work rewarding. Still, the increasing demand for papers of this nature is cause for concern.

As mentioned in the previous local news Kee Teo was invited to National University of Singapore (NUS) as a Visiting Scientist at the end of last year for three months. His timing was wrong, as it rained almost every day during his stay there. As a consequence, he says, he had nothing better to do most of the time but to do some research. Kee was working on a book on chromatic polynomials in collaboration with Professor Khee-Meng Koh of NUS and Dr Feng-Ming Dong of Nanyang Technological University. It was not all work and no play though. Kee enjoyed the three festive seasons: Malay New Year, Christmas, and Chinese New Year. He managed to find time to visit friends and relatives. He also went to the village where he was born.

Professor Bob Richardson from Appalachian State University, Boone, North Carolina is visiting us this semester and is making a huge contribution to our efforts to improve and extend the WebCT component of our teaching. He is also sharing his experience with us as we wrestle with the problem of how best to use graphical and symbolic manipulation software to enhance our teaching of calculus. And he likes it so much here that he has bought a house in Pahiatua! He plans to spend Northern winters with us after he retires next year, and to keep up his contribution to our teaching activities.

A number of Massey people attended the NZMRI summer workshop, including Charles Little, who writes: "Massey was extraordinarily well represented at the New Zealand Mathematical Research Institute's summer workshop, which was held this year during January 5--11. Participants from Massey included Catherine McCartin, Barbara Holland, Korrakot Chartarrayawadee, John Hudson, James Matheson and Paul Gardner and I. We were treated to some outstanding speakers, seven from America and one each from Canada, Britain and Germany. It was my first experience at such a workshop and I was impressed".

Robert McLachlan writes: "Today (3 April) the winner of the inaugural Abel Prize (www.abelprisen.no) was announced upstairs by the Norwegian Academy. The prize (worth approximately $1.5m) goes to Jean-Pierre Serre. His initial reaction was "Oh." Meanwhile, we are wondering how we are going to get home, given that Massey is recommending a ban on all international travel."

From the Allan Wilson Centre:

The intersection of IFS and the Allan Wilson Centre currently contains five people, Mike Hendy (PI and Executive Director), Barbara Holland (post-doc), Paul Gardner and James Matheson (PhD students) and Tim White (Computer support and scientific programmer).

Barbara Holland was successful in obtaining an NZS\&T Post doctoral Fellowship, which brought her back from Bochum in Germany. She is currently working on a number of projects relating to evolutionary tree computations and efficient model strain selection, as well as completing the projects begun in Bochum. Results of her PhD thesis work have now appeared in the latest issue of Systematic Biology.

Paul Gardner is in the final stages of writing his thesis, which is planned for submission before this newsletter is completed. Then he will leave in July for a post-doc with Professor Robert Giegerich, at Bielefeld in Germany, where he will continue his investigation into RNA folding. Paul's PhD project here has been in Ribonomics, in both developing tools to search sequence databases for novel RNA "proteins", and investigating the question as to why, in the early evolutionary stage of the RNA world (which is postulated to precede contemporary DNA) the coding was restricted to just four nucleotides. A paper based on this has just appeared in the Proceedings of the Royal Society (series B).

James Matheson, a local mathematics graduate, was successful in obtaining a 2003 Massey University Doctoral scholarship. He has just begun work on relating the evolution of viruses, particularly influenza. The historical records of influenza strains give a peculiar shaped evolutionary tree, which he is investigating.

Meanwhile Tim White has been assisting in the implementation of programs on HELIX, our 132 processor parallel computer run by IIMS at MU Albany. Much of the current usage of Helix has been by Allan Wilson Centre members, but it is available for outside usage, and any potential user should contact our business manager, Susan Wright (s.m.wright@massey.ac.nz).

Mike Hendy is preparing for a visiting professorship at l'Institut Henri Poincare, situated in the centre of Paris, for four weeks in May-June. He will be part of a teaching programme entitled "Mathematics, Informatics and Genomics" for French researchers, which will be followed by a one week research conference.

All of our subgroup attended the Helix workshop in January, and the annual phylogenetics meeting, held at Kaikoura in February. Because of its popularity, the Kaikoura meeting was over subscribed and attendance had to be limited to 50. The 2004 meeting will be held from February 16--20, at Whakapapa

Village. Details are available on our website http://awcmee.massey.ac.nz/

Seminars

Professor R L (Bob) Richardson (Appalachian State University Boone, North Carolina), "WebCT for Mathematics. Linking mathematics to the outside world".

Marijcke Vlieg-Hulstman

Institute of Information and Mathematical Sciences (Albany)

Mathematics

The start of 2003 has seen record growth in student numbers and the Albany campus now has over 6000 students. An impressive effort considering the university is only ten years old. This growth did lead to some strains on resources and there were some stressful first days to the semester.

Geoff Aldis from the mathematics department, UNSW at ADFA, Canberra was the first occupant of our new visitor's room. He spent a month working with Mick Roberts on a model for the invasion of a population by an infectious disease, and its containment by vaccination and/or quarantine.

Professor Graeme Wake is now with us for the first half of every week, spending Thursday and Friday at Canterbury University where he still has teaching commitments. Graeme is busy organising the Mathematics in industry study group which will be held in New Zealand in 2004 and 2005 as described in the article on page 22 of this newsletter.

Finally, the mathematicians have completed the move to their new building and are now enjoying larger offices and air-conditioning although some of us are missing being able to open the window.

Seminars

Robin K Milne (University of Western Australia), "Statistical Inference for Ion Channel Data".

Geoffrey Aldis (UNSW at ADFA, Canberra), "Models of tracer exchange during liver perfusion experiments".

Carlo Laing, "Pattern Formation in Neural Systems".

Mike Meylan

UNIVERSITY OF OTAGO

Department of Mathematics and Statistics

Boris Baeumer was on conference leave in December/January. He was invited to present a poster on "Advection and Dispersion in Time and Space" at the AGU meeting in San Francisco that was held from December 6-10. From 7-14 January he was invited main speaker at the International Conference on Evolution Equations, Control Theory, and Applications to Engineering Problems in Maracaibo, Venezuela. Unfortunately, due to widespread rioting the conference got cancelled and Boris gave his presentation at the organizers' home institution, Louisiana State University. He used the time between the conferences to conduct research for four weeks with colleagues in Reno, Nevada. He also gave a presentation at the University of Tuebingen in Germany while showing off his now one-year old son to his friends and relatives.

John Curran spent the second semester on leave in the northern hemisphere. On the way he attended the 2nd International Conference on the Teaching of Mathematics, in Hersonissos, Crete, which was a bigger (but hopefully no better) version of the Delta '03 conference he is helping with in Queenstown in November. The first 3 months he spent at the National University of Ireland, Galway, working in his area of algebra: group theory. He noted with interest that the new degree in financial mathematics introduced there included papers in group theory (and much other pure mathematics), so perhaps NZ can emulate the success of the "Celtic Tiger" by recommending this sort of background for its financial whiz kids! The last three months he spent at the Centre for Teaching Mathematics at Plymouth University, England, looking at some of the technology they use in presenting their mathematics courses.

Our fourth attempt at filling the vacant Chair in Statistics was unsuccessful and so the position will remain unfilled at least for the immediate future. To help fill the gap in teaching staff Darryl MacKenzie from Proteus Research will teach a large part of our stage 2 Design of Research Studies paper. The statisticians also appear to have been successful in convincing their mathematics colleagues of the virtues

of statistics: Boris Baeumer will teach one half of the paper Probability and Inference 3. Nick Dudley Ward (recently The University of Auckland and University College London) taught a Summer School paper called 'Casino Studies' with a focus on applied probability and risk management.

With the onset of the New Year, Richard Barker and Markus Neuhäuser also started new tasks as Associate Editor of *Biometrics* and *Communications in Statistics*, respectively.

In February, Markus attended the First New Zealand Bioinformatics Conference in Wellington, where he presented a paper entitled "Exact tests for the analysis of case-control studies of genetic markers". We are looking forward to the Second Asia-Pacific BioInformatics Conference that will be held in Dunedin in January 2004 (see www.fit.qut.edu.au/~chenp/APBC2004 for further information).

John Harraway has been appointed Scientific Secretary for the International Programme Committee for ICOTS-7 (International Conference on Teaching Statistics) which is to be held in Brazil in the summer of 2006.

Claire Cameron, currently Senior Teaching Fellow at our department, started to do a PhD under supervision of Richard Barker.

Stephanie McConnon has stepped down as Organising Tutor in favour of working part time. Warren Palmer has taken on this position.

The last newsletter was written just prior to our HoD, Vernon Squire, co-convening the 16th IAHR International Symposium on Ice at the University of Otago from 2-6 December 2002. It was incredibly successful, with 150 participants from 17 different countries attending plus 20 accompanying persons. A total of 145 papers on river, sea and lake ice were presented on the theme of the conference, which was floating ice. Two volumes of the proceedings entitled *Ice in the Environment* were handed out at the Symposium, the third volume including discussion is being finalized at the moment. Dunedin weather was perfect, as it always is, a little dry and sunny perhaps but the delegates appreciated it. Two highlights–apart of course from the sessions themselves–were the tour on the peninsula, involving visits to the Marine Studies Centre, a cruise on the Monarch, the Royal Albatross Colony and Penguin Place, and the conference dinner at Lanarch Castle where a piper piped us in and we dined on a brace of freshly-caught, young haggis. We were amazingly lucky–everything went well and we have had an endless stream of positive email from the folk who attended.

A departmental review took place just before the IAHR Symposium and we have now had the written report back. Its pretty positive, mirroring a lot of the stuff we had said in our self-review. A few curriculum changes here and there to tidy things up, lots of statements that we can use to improve our lot, and the minimum of criticism.

This year will see the introduction of the PBRF, a process that Vernon especially will be involved in. It is going to make for a very interesting year that is expected to be full-on for all of us.

Visitors

Prior to the start of the semester, Stefan Steiner (University of Waterloo, Canada) visited the Department and presented the seminar "An Overview of Statistical Engineering".

Jennifer Hoeting and Geoff Givens, both Associate Professors at Colorado State University, are visiting the Department until the end of July. Their research interests are statistical computing, Bayesian methods, whale population dynamics (Geoff) and Bayesian statistics, spatial statistics, and model selection (Jennifer). They are jointly working on a statistical computing book. Last Saturday, however, they could be seen at Carisbrook watching the Highlanders narrowly lose to the Crusaders.

Jill Dietz, Associate Professor at St Olaf College, USA, is visiting until the end of June. Jill's research interest is algebraic geometry.

Miroslav Lovric, Associate Professor at McMaster University, Canada, is visiting until the end of April. Miro is working with Derek Holton on mathematics education. Another of his research interests is algebraic topology.

Lisa Avery, one of our statistics postgraduate students, celebrated the New Year by safely delivering a baby boy.

Seminars

John Williams (Department of Marketing), "Structural equation models for heterogeneous data: A finite mixture model approach".

Stefan Steiner (Institute for Improvement in Quality and Productivity, Department of Statistics and Actuarial Science, University of Waterloo, Ontario Canada), "An overview of statistical engineering (Shainin methods). Seven habits of highly effective industrial problem solvers".

Bill Jackson (University of London), "Rigidity of frameworks and unique realizability of graphs".

David Evans (Department of Mathematics University of Bristol), "Scattering by narrow cracks in floating ice-sheets in finite water depth"

Ivan Reilly (The University of Auckland), "Topological concepts and language".

Richard Barker "Modeling birth processes and population growth using mark-recapture data".

Jennifer Hoeting (Colorado State University), "Statistical models for stream ecology data".

Derek Holton "Mathematics education–a philosophy".

Markus Neuhäuser, "Exact tests based on the Baumgartner-WeiB-Schindler statistic".

Miroslav Lovric (Department of Mathematics and Statistics, McMaster University, Canada), "Jumping over the fire: Mathematics issues in the high school to university transition".

Mike Paulin (Department of Zoology and Centre for Neuroscience), "Fractional derivatives in neural coding of motion: Implications for modelling distributed computation underlying perception and control of movement in animals and machines".

Lenette Grant

THE UNIVERSITY OF WAIKATO

Department of Mathematics

We have a number of new appointments in the department. Dr Tim Stokes is due within the next few days to take up a lectureship. He was formerly at Murdoch University in Perth and has research interests in algebra. Another new lecturer is Dr Jacob Heerikhuisen who is on a six-month contract. He is a former PhD student from the department and has research interests in magnetohydrodynamics with emphasis on magnetic reconnection. The other new appointee is David Harder who has recently submitted his PhD thesis. He has a three-month appointment as a post-doctoral fellow working with Ernie Kalnins.

Congratulations are due to Sean Oughton on being promoted to Senior Lecturer. Sean spent two weeks in February at some workshops in Palm Springs and Laguna Beach. He had to endure hardships like staying at the Hilton. As an achievement of some sorts, Stephen Joe is across the bar in the Senior Lecturer scale for the third time. Stephen had James Lyness from Argonne National Laboratory visit him for a week in February.

Kevin Broughan has returned from research leave at Columbia University. While there, he also participated in seminars at Rutgers (Henryk Iwaniec's lectures) and NYU (Peter Sarnak's series). He reports that number theory is thriving in the New York area, with a joint number theory seminar programme between Columbia, NYU and City University organized to start in September 2003.

Now it's Ian Craig's turn to take study leave. Ian has left for the US and besides time there, plans to spend time in Italy and the UK. While Ian is away, Alfred Sneyd is Acting Chairperson.

Another traveller was Ernie. He spent three weeks in February in Minnesota. He also had a former postdoc, Jonathan Kress, visit for two weeks towards the end of January. Also visiting Ernie was Stefan Rauch-Wojciechowski from Linköping University in Sweden who visited for two months from last December.

Our first year student enrolments appear to be up on last year. However, because of the new student record system in use for the first time this year, it is not easy to be certain what the actual enrolment figures are.

Seminars

C Laing (Massey University, Albany), "Pattern formation in neural systems".

E Kalnins,] "Classical and quantum constants of the motion (explicit techniques)".

S Rauch-Wojciechowski (Linköping University), "From Jacobi problem of separation of variables to theory of quasi-potential Newton systems".

Stephen Joe

Department of Statistics

Things have been relatively quiet in the department lately. Nye John has returned from leave. At the end of his sabbatical he attended the GENSTAT conference which was held in Busselton, Western Australia. Also attending the conference was Dave Whitaker. Nye and Dave were visited in January by Emlyn Williams from CSIRO, Canberra. Emlyn was relieved to know that his home was not one of the ones destroyed by the disastrous bush fires, but the area he lives in was high risk, and many properties close to his, were destroyed.

Bill Bolstad and James Curran are both currently on leave. Bill is working on his book, "Introduction to Bayesian Statistics" which is to be published by Wiley later in the year. James is visiting England, where he is working in the Research and Development Unit of the Forensic Science Service. While he is away he hopes to catch up with Alain Vandal in Montreal. James and his wife Karin have a second daughter. They welcomed Fiona into their family in October, 2002.

Lyn Hunt was visited by Kaye Basford, from the University of Queensland in February. Bruce Miller (our part-time tutor) survived teaching our first year statistics course over Summer school.

An upcoming event in the department is the "One-Day Workshop on Popular Methods for Supervised Learning". This is to be conducted by Professor Trevor Hastie from Stanford University California. It will be held at the McMeekan Centre at Ruakura on April 3, 2003.

Seminars

Niall Broekhuizen (NIWA, Hamilton), "Verification of an individual-based model of the foraging of southern Buller's albatross by comparison with ship-board observations."

Bryan Manly (Western EcoSystems Technology Inc, Laramie, Wyoming, USA), "The assessment of forestry on northern spotted owls."

Robert G Newcombe (Reader in Medical Statistics, University of Wales College of Medicine Cardiff), "Confidence intervals for proportions and related quantities."

Martin Upsdell (AgResearch, Ruakura), "From analysis of means and analysis of coefficients to analysis of curves."

Marti J Anderson (Department of Statistics, Tamaki Campus, The University of Auckland), "Canonical analysis of principle coordinates: Flexible constrained ordination."

Mik Black (Department of Statistics, The University of Auckland), "Statistical issues in the design and analysis of spotted microarray experiments."

Judi McWhirter

VICTORIA UNIVERSITY OF WELLINGTON

School of Mathematical and Computing Sciences

We welcome Yinhuo Zhang who took up a lectureship in February. He works on Hopf algebras, and comes to us from the University of the South Pacific. For more information on Yinhuo Zhang see the New Colleagues Section.

Asat Arslanov has joined us as a post-doc working on Kolmogorov complexity in part with Rod Downey.

Peter Komisarczuk is about to take up a senior lectureship in Computer System Engineering. He is an expert in networks, most recently working for Nortel in the UK.

Bill Naylor has a fixed term position in Computer Science. He has been working on computer algebra systems and projects such as OpenMath.

Rod Downey is working on his Maclaurin fellowship for the year, courtesy of NZIMA. As a result we have been able to invite a number of visitors who are contributing to the teaching programme. They

include Srinivas Chakravarty working with Stefanka Chukova on warranty systems, Amparo Baillo, working with Estate Khmaladze on point processes and change sets, and Evan Griffiths has stayed on after his post-doc with Rod finished. We have also appointed Steven Archer, a PhD student of Geoff Whittle, as senior Tutor to administer our 100-level Maths courses.

Mark McGuinness is just back from visiting the Division of Applied Mathematics, Korean Advanced Institute of Science and Technology, South Korea. As part of this applied mathematics collaboration between New Zealand, Australia, Canada and South Korea, there is a meeting early in July to promote the idea of holding Mathematics-in-Industry Study Groups in South Korea in future years. Check out the URL: http://parter.kaist.ac.kr/imi/ and the article appearing elsewhere in this Newsletter.

Our congratulations go to Wu Guohua, Rod's FRST post-doc, who is now a proud father.

John Randal successfully completed his PhD in financial mathematics, and previously so did Fiona Walls on aspects of mathematics in the classroom, and Tracy Bai on statistical analysis of wireless communication systems.

The MATH and STOR groups are performing well at 100 level in regard to the university's goal of getting closer to the long term target to achieve Maori and Pacific enrolments in line with their proportion in the population (approx 14\% and 5.5\% respectively). In particular in terms of Maori enrolments all three offerings of STAT193 are close to 10\% Maori enrolment. Our first-year MATH courses are close to 10\% with MATH104 at 15\% and MATH114 (2/3) at 14\%. With Pacific Nations students our target is about 5.5\%. STAT193 (1/3) and MATH114 (2/3) have over 4\%, MATH104 has 5\% and the best is MATH103 at 8.5\%. However, none of our second year courses come close to meeting this target.

Estate Khmaladze was visited in January by Dr Spiridon Penev from the University of New South Wales, Sydney, who gave a talk on his research in wavelet methods. Professor Wolfgang Weil, Director of the Institute of Mathematics, University of Karlsruhe, Germany, will visit Victoria University of Wellington from 16 March to 15 April. Professor Weil is one of the world's leading specialists in differential geometry and he will work with Estate on his Marsden grant on "Local point processes in the neighbourhood of sets". Estate is currently two thirds of the way through a series of six seminars that he is presenting in Wellington on "Martingale Methods in Orthodox Statistics". Estate is also the Programme Chair of the Tbilisi Conference in Probability Theory and Mathematical Statistics, to be held from 22--28 September 2003, devoted to the centenary of the birth of A N Kolmogorov. The conference is hosted by the Georgian Academy of Sciences, its A. Razmadze Mathematical Institute and N. Muskhelishvili Institute of Computational Mathematics, jointly with the Georgian Statistical Association.

Megan Clark spent ten days in the United States during February, as an invited guest of the National Institute of Health federal programme to increase cultural diversity in the biomedical professions and especially in research in the biomedical area. Given that the mathematical sciences are often an obstacle in this regard, Megan was "head hunted" and given five star treatment as a guest of the University of Kansas and the Haskell Indian Nations University. She evaluated the programmes currently in existence there, made suggestions for alterations, participated in discussions, and presented a seminar on what is done here in New Zealand (and at Victoria University of Wellington in particular).

Over December 2002 and January 2003, Yu Hayakawa visited Dr Paul Yip at the University of Hong Kong. Yu also worked with Dr Liping Liu from Peking University during that time. Dong Wang was invited to visit the Department of Mathematics and Statistics, RMIT University, Australia from 1 December 2002 to 14 February 2003. While there Dong was engaged in a multivariate research program; in particular, he worked on aspects of censored regression analysis and its applications.

David Vere-Jones was in Taiwan in November 2002, at the National Central University, where he lectured on point processes and earthquakes. On the way back to Wellington, David briefly visited Yosi Ogata and his student Jiancang Zhuang in Tokyo, Japan. David has had several visitors to Wellington already in 2003, including a return visit from Jiancang Zhuang, working on earthquake modelling and forecasting issues. Dr Shiyong Zhou, a lecturer at Peking University, has joined the Victoria University of Wellington Geophysics Institute for a year on an exchange lectureship, but will be working mainly with David Vere-Jones and David Harte on earthquake modelling and forecasting. Dr Daryl Daley arrived at Victoria University of Wellington early in March to work with David Vere-Jones for two weeks on Vol.\ II of the 2nd edition of their Springer monograph on point processes; Vol. 1 appeared in December 2002.

John Haywood spent quite a bit of the summer on parental leave looking after Helen, who arrived safely on 5 December 2002. Helen has enjoyed herself since then, teaching John and her mum quite a lot about nappies and fluid flow, and also helping to conduct an extensive research program into variable sleep patterns.

Yu Hayakawa is now the Statistics and Operations Research Program Director, while Dong Wang has

taken on the role of Graduate Studies Coordinator. John Randal has secured a lectureship in econometrics/finance in the School of Economics and Finance at Victoria University of Wellington. Two new PhD students (Steven Johnston, who is on a Victoria University of Wellington Graduate Scholarship and Eldon Paki, who is on a Public Health Intelligence Graduate Scholarship) join Nuovella Williams in the STOR programme.

Seminars

Dr Spiridon Penev (Department of Statistics, UNSW, Sydney, Australia), "Approaches to improve the flexibility of wavelet-based methods in density estimation, regression and signal analysis".

Daniel Ballinger, Rilla Khaled, Craig Anslow, "Spreadsheet Visualisation / InspectJ / Visualising Reusable Components".

Estate Khmaladze, "Martingale Methods in Orthodox Statistics–Asymptotic theory of statistics of sequential ranks" (a series of six seminars).

Nigel Cutland (University of Hull), "A survey of nonstandard techniques and applications in fluid mechanics".

Rilla Khaled and Daniel Ballinger/Alex Potanin, "A Case Study of Visualisation using AspectJ, Spreadsheet structure inspection using low level access and visualisation".

Peter Komisarczuk (Nortel Networks, United Kingdom), "Ethernet Services for Next Generation Broadband".

Professor Alan Agresti, "One-Day Workshop on Analysis of Repeated Categorical Measurement Data".

Milton Ngan (Weta, Wellington), "Tales from the Two Towers".

Dr Daryl J Daley (Australian National University), "Modelling Long Range Dependence and Point Processes".

Ludwig Staiger, "How Much Can You Win When Your Adversary is Handicapped?"

Srinivas Chakravarthy (Kettering University, Flint, Michigan, USA), "The Batch Markovian Arrival Process: A Review and Future Work".

Srinivas Chakravarthy (Kettering University, USA), "Impact of worker cross-training in service systems".

Dr Mark Moir (Sun Microsystems, Boston), "Obstruction-Free Synchronization".

Sebastiaan Terwijn "Effective Measure and Hausdorff Dimension".

Mark McGuinness

[]

NEWSLETTER

OF THE

NEW ZEALAND MATHEMATICAL SOCIETY (INC.)

Contents

OBITUARY

Emeritus Professor Bernhard Neumann, AC DSc FAA FRS
(15 October 1909 to 21 October 2002)
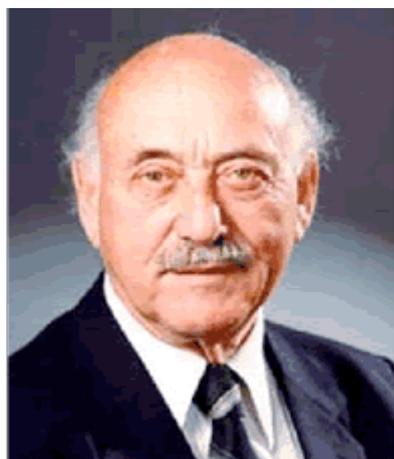
The mathematical community in Australasia lost a distinguished member and patron when Bernhard Neumann died, aged 93, in Canberra late last year. The New Zealand Mathematical Society lost one of its foundation members, who was instrumental in establishing the NZMS in 1974 and was elected as an Honorary Life Member soon afterwards.

Bernhard Hermann Neumann was born in Berlin-Charlottenburg, Germany in 1909, and after showing aptitude for mathematics at an early age he studied at university in Freiburg and Berlin, and gained his first doctorate (in group theory) in 1932, at the age of 22. He moved to England in 1933, and two years later completed a second doctorate at the University of Cambridge, from which he also won the Adams Prize.

He married Hanna von Caemmerer (another mathematician) in 1938, and the couple had five children: Irene, Peter, Barbara, Walter and Daniel. Peter Neumann and Walter Neumann are also mathematicians well known to many readers of this Newsletter.

Bernhard was a lecturer at Cardiff until the second world war, when he was interned for several months (as an enemy alien) but later served in a variety of roles for the British Army, while Hanna completed her doctorate at Oxford. Bernhard subsequently held academic positions at the Universities of Hull and Manchester, where he pursued research in algebra and supervised a significant number of students, many of whom have become professors in various parts of the world. Bernhard served on the Council of the London Mathematical Society from 1954 to 1961, including a term as Vice-President from 1957 to 1959, and he was elected a Fellow of the Royal Society of London in 1959.

In 1962 Bernhard was appointed as Foundation Professor of Mathematics in the Research School of Physical Sciences at the Australian National University, and soon after Hanna was appointed as a Professor of Pure Mathematics in the School of General Studies. Bernhard was elected as a Fellow of the Australian Academy of Science in 1964. He was President of the Australian Mathematical Society (1964-66) and Foundation President of the Australian Association of Mathematics Teachers (1966-67). He was a driving force behind the establishment of the Bulletin of the Australian Mathematical Society in 1969, and served as its editor for 11 years.

Together with Hanna he attended many of the annual NZ Mathematical Colloquia in the 1960s, and his suggestion that New Zealand mathematicians form a special geographical branch of the Australian Mathematical Society proved a very effective catalyst for the formation of the NZ Mathematical Society in 1974. In fact Bernhard became the very first paid-up member of the NZMS, and continued to support it in many ways in the years following.

Hanna died in 1971 after a brief illness. Bernhard married again in 1973, to Dorothea Zeim, and they continued living in Canberra following his official retirement from the ANU in 1974.

Bernhard published well over 100 research articles in international journals, as well as numerous scholarly reviews, lecture notes and essays about important mathematics and mathematicians. His research covered a range of topics in pure mathematics, and he made particular contributions to the theory of division rings, universal algebra, varieties of groups, automorphism groups, wreath products of groups, and group presentations (including what are now known as HNN extensions, named after Graham Higman, Hanna Neumann and Bernhard Neumann).

He gave lectures at very many conferences and universities around the world during his long career, and provided valuable advice and mentorship to a large number of early career researchers and students, not just his own. Also following his retirement he continued to serve the mathematical community by publishing further research, actively participating in conferences and giving lectures, and editing the superbly informative IMU Canberra Circular, which was distributed worldwide.

Bernhard was a strong supporter of ANZIAM (Australia and New Zealand Applied Mathematics) and the CMSA (Combinatorial Mathematics Society of Australasia), and a regular participant in their annual conferences. He was also a vital supporter of the Australian Mathematics Competition (which operates in schools in Australia and New Zealand), and very well known for his encouragement of students in all branches of the subject. The annual prize of the Australian Mathematical Society for the best paper presented by a student at its annual meeting bears his name.

He served on numerous other committees and provided valuable advice to many individuals and mathematical science departments in Australia and New Zealand. For example, in 1987 he encouraged the Mathematics and Statistics Department at The University of Auckland to limit its practice of sending its graduate students overseas and to build up its own PhD programme.

Bernhard loved cycling, music, chess, fine wines, walking in national parks, and spending time with friends and his family.

He was awarded seven honorary degrees, and in 1994 he was made a Companion of the Order of Australia. Bernhard Neumann's contributions to the international community during his lifetime have been remarkable, and he will be very much missed.

FEATURES

THE ANZIAM MATHEMATICS-IN-INDUSTRY STUDY GROUPS ARE COMING TO NEW ZEALAND

By arrangement with ANZIAM (Australia New Zealand Industrial and Applied Mathematics, which is a Division of the Australian Mathematical Society but embraces both countries), the ANZIAM Mathematics-in-Industry Study Group (MISG), which has operated in Australia since 1984, is shifting to New Zealand for 2004 and 2005. Initiated by Dr Noel Barton of CSIRO, the MISG meetings have moved around the state capitals of Australia, and most recently were hosted by the University of South Australia in Adelaide.

New Zealand participation has steadily increased and at the recent MISG in February 2003, three of the twelve problem moderators were New Zealanders. The Australia-based ANZIAM organisers are, of course, now heavily involved in the hosting of the forthcoming ICIAM Congress in Sydney in July 2003, which is a really major commitment.

The goals of MISG are to reach out to industry (interpreted very broadly to include biological, medical and financial applications, as well as the traditional engineering-based ones) to show them the power of mathematics when it is applied to their particular problems. Through the holding of MISG meetings, academic mathematicians find out about real applications, and many postgraduate projects in Industrial Mathematics arise through MISG involvement. The impact on the teaching of Applied Mathematics is very positive in every country where these types of activities exist (e.g., UK, Europe, USA, Australia).

Following the formation of the Centre for Mathematics in Industry (CMI) within the Institute of Information and Mathematical Science (IIMS) at Massey University's Albany campus, it has been recommended that the MISG's in 2004 and 2005 be organised from there, using a network of collaborating institutions throughout the country.

Principal arrangements are now being made by Professor Robert McKibbin (Head of IIMS) and Professor Graeme Wake (Adjunct Professor of Industrial Mathematics within CMI). Graeme Wake has been nominated as Director of MISG and is now devoting half his time to this initiative. It is intended that the Centre will continue this kind of industry-linkage after the MISG (ANZIAM) returns to Australia in 2006.

We are pleased to announce that MISG 2004 will be held:

- at The University of Auckland (City campus)
- 26-30 January 2004

(Note that ANZIAM 2004 follows immediately afterwards in Hobart, 1-4 February 2004).

To provide new links with potential industrial partners, three regional preliminary workshops are planned for later this year, following ICIAM 2003. These will be held in:

- Wellington, at Industrial Research Ltd, 4-5 September 2003
- Auckland, Massey University at Albany, 30-31 October 2003
- Christchurch, LincLab at Lincoln, 4-5 December 2003.

New industrial participants will be exposed to past MISG case studies at these informal meetings. It is expected that industrial partnerships will form with mathematics groups as a result of these activities.

Everyone is invited to participate in all of these meetings–there is no charge for academic and student participants. Industrial participants in MISG 2004 and 2005 will be asked to contribute to the costs of those meetings.

Funded by the NZ Institute for Mathematics and its Applications, Postgraduate Scholarships are available for support of Masters and Doctoral thesis study in any area of industrial mathematics. Details of these appear elsewhere in this Newsletter. Prospective students are invited to apply.

Robert McKibbin
Head, IIMS

Graeme Wake
Director, MISG 2004-5

APPLIED MATHEMATICIANS IN SOUTH KOREA

Following up on a conversation with Dr Douglas Rogers, Graeme Wake, subsequently on sabbatical at Oxford from the University of Canterbury, initiated discussions with other visitors to OCIAM on the possibility of forming a Visiting Foreign Team Professorship in Applied Mathematics at KAIST (Korean Advanced Institute of Science and Technology), a leading university with a strong graduate programme in South Korea. This happened in the last half of 2001.

A team of four was then formed to formulate a proposal to submit to Professor Kil Hyun Kwon, the Head of the Division of Applied Mathematics at KAIST. In addition to Graeme, the Team includes John Donaldson from the University of Tasmania, Mark McGuinness from Victoria University of Wellington, and Henning Rasmussen from the University of Western Ontario. The proposal was accepted. To assist with developments, each member, in succession, makes short visits hosted by the Division of Applied Mathematics at KAIST. These began in September 2002, and are scheduled to continue until August 2005.

The major objective is to create interest in, and enthusiasm for, the application of mathematics in industry amongst the staff and students in KAIST and to provide input for these ideas in the curriculum.

The wide range of experience of the Team members in research, teaching, exposure to industrial mathematics programmes at OCIAM and IMA(US) and attendance at MISGs in Australia was brought to bear in forming the plan which includes

- the development of a teaching programme at masters/PhD level and
- the establishing of industrial contacts through the gradual introduction to South Korea of a Mathematics in Industry Study Group (MISG) similar to that currently operating in Australia and New Zealand.

The Team hopes to foster relationships between Asia and Australia and New Zealand. Three students and Professor Kwon came from KAIST to participate in the MISG held in Adelaide in February 2003. In addition a showcase meeting about MISG is scheduled to be held in KAIST in July, the week before ICIAM 2003, involving members of OCIAM and the Team.

John D Donaldson, University of Tasmania, Hobart
Graeme Wake, University of Canterbury & Massey University at Albany
Mark McGuinness, Victoria University of Wellington
Henning Rasmussen, University of Western Ontario, Canada

Graeme Wake
John Donaldson

"IT WAS GREEK TO ME"
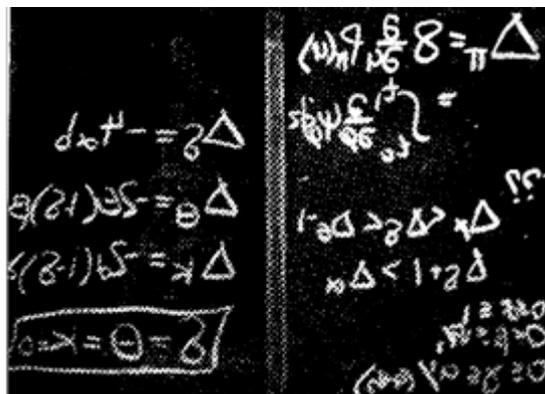
The *New Zealand Herald* published an article (Wednesday, August 14, 2002) about the creative accounting practices of some dairy business, illustrated with a photograph of some equations chalked on a blackboard.

The editor of that article appears to have glanced at that photograph and to have recognized the Greek letters l and q in those equations. Presumably she decided that "It was Greek to me" (as did Casca, in

Julius Caesar), and passed the photograph for publication.

Garry J Tee

CENTREFOLD

Bruce Weir

Bruce Weir is one of New Zealand's most valuable exports. Bruce is now William Neal Reynolds Distinguished Professor of Statistics and Genetics and Head of the Bioinformatics Research Center at North Carolina State University in Raleigh. In addition to an extensive and deserved reputation in the fields of genetics and statistics he has also made a central contribution to my own field of Forensic Science. His CV containing seven books, four named lectures, 19 PhD and 13 postdoctoral students, 143 refereed papers, nine editorial positions, 26 articles of correspondence, six encyclopedia entries, and a host of honours including being elected to an honorary FRSNZ in 1998 and a fellow of the American Statistical Society in 1999, does not do justice to his contribution to several fields of scientific endeavour. For non-statisticians, the OJ Simpson case is perhaps what Bruce is most famous for. However, it is but one highlight in Bruce's multifaceted career. What was his path from Christchurch New Zealand, to the Superior Court in the County of Los Angeles to testify in the Simpson case?

Bruce will be 60 on New Years Eve, 2003. It's always easy for me to remember his birthday. His slim frame is still fully capable of disarming a robber who went for his wallet and he's walked me into the ground more than once. We have travelled the world together lecturing and I'm always the first to fade while he is still teaching or working.

He is the eldest child of the late Gordon and Peg Weir. His mother, aged 83, two sisters and a brother all still live in New Zealand. He was a foundation pupil of Shirley Boys' High School and attributes some of his success to the headmaster, Charles Gallagher, who spotted his potential and encouraged him to pursue further study. He went to University of Canterbury, graduating with a BSc (with first class honours in Mathematics) in 1965. After stints working on rubbish trucks and painting walls in local hospitals he obtained a summer internship with the Applied Mathematics Division of the DSIR working with Brian Hayman. Prior to his internship Bruce had concentrated solely on mathematics and was completely ignorant of genetics. Recall that this is time in the history of genetics when greats like R.A. Fisher, S. Wright, J.B. Haldane, J. Crow and M. Kimura were active. Brian's asking him to read the book "Genetics" by H. Kalmus began the great synergy of mathematics and genetics that has shaped the rest of Bruce's career.

After graduation from Canterbury he worked for eight months at the DSIR in Wellington and then following Brian Hayman's suggestion went to North Carolina State University to pursue his PhD in statistics with a minor in genetics under Clark Cockerham. The chance to study with one of the greats of our time was an opportunity that Bruce did not waste, beginning a partnership that was to last 30 years ending only with Dr Cockerham's death. Bruce asserts that he has been blessed by being allowed to use his love of mathematics and statistics in an area that is endlessly fascinating.

After receiving his PhD Bruce spent a postdoctoral year followed at University of California, Davis working with Bob Allard. Bruce returned to New Zealand in 1970 as a senior lecturer and later reader at Massey. During this time Bruce or maybe his fancy car, a 1966 green-blue Mustang, caught Beth's eye, leading to marriage and a life long friendship that is still obvious to even the most casual observer. Beth is

herself a respected academic with interests in the theory and practice of early reading teaching. Bruce and Beth's two children, Claudia Beth in 1973 and Henry Bruce in 1975 were born during the seven years the Weirs spent at Massey. Henry was a month old when the family returned to North Carolina in 1976 to continue Bruce's work with Clark Cockerham. New Zealand nearly lured Henry back with the promise of the outdoor life, but both children are now firmly ensconced in the United States.

Starting with his PhD thesis, Bruce's early work was mostly concerned with the formulation of the genetic relationship between individuals in diverse populations at multiple loci. Working with his mentor, Clark Cockerham, he formulated identity by descent measures at two linked genes between individuals under many differing situations. These included a consideration of inbreeding, selection, and overlapping populations. He also considered sib-ships and other pedigrees, mixed self and random mating populations; and reciprocal crosses. This pioneering work laid the rigorous foundation to characterise the relationship and inheritance of multiple genes with linkage, inbreeding and selection in diverse populations.

> "One of Bruce Weir's enduring contributions to statistical genetics is his monumental work on the elaboration of descent measure theory. This theory provides the mathematical tools for following the transmission of genes and pairs of genes through multiple generations. These tools can then be applied to solving a wide variety of problems ranging from analysis of the dynamical behaviour of linkage disequilibria in mixed mating systems, to the estimation of effective recombination rates between genes based on population data, to the dissection of complex traits." Michael Clegg, Presidential Chair and Distinguished Professor of Genetics, University of California at Riverside.

Bruce then shifted his attention to constructing statistical methodology to infer genetic relationship measures, such as linkage disequilibrium (LD). He provided the statistical framework for inferring the complete LD structure between two loci based on genotypic data and also examined the sampling properties of LD statistics. At this time he published a seminal in LD analysis. This line of work provided critical foundation theory for disease gene mapping research. Bruce Weir and his colleagues developed the statistical methodology to infer linkage between molecular markers and disease genes to test and estimate the genomic location of disease genes. These statistical methods have been widely used in the scientific community and directly applied by him and his collaborators to successfully locate cystic fibrosis genes and a longevity gene in humans.

> "Bruce Weir has made central contributions to the statistical methodology for complex trait analysis through his painstaking work on the theoretical calculation of genetic variance components in the presence of genetic linkage and finite population size." Michael Clegg.

> "He [Bruce Weir] has pioneered the localization of human disease genes through new statistical procedures." Major Goodman, William Neal Reynolds and Distinguished University, Professor of Crop Science, Statistics and Genetics, North Carolina State University.

Bruce Weir's work on genetic relationship measures is closely related to the study of population genetic structures, i.e. the structure and level of differentiation and relatedness among individuals in structured populations. Sewell Wright in 1951 proposed a set of statistics, called F-statistics, to characterise population structures. It was Weir and Cockerham in 1984 who unified the statistical methods for estimating F-statistics. This paper is a citation classic in population genetics and forensic science with a staggering 1,676 citations–so far! Bruce's papers include the two most authoritative reviews of research progress in the study of population structures in human and other species.

> "Among his basic work he [Bruce Weir] has, in particular, developed methods which have been and continue to be widely used world-wide for studying the differentiation among populations, including groups and populations of animals and plants in nature, livestock breeds, and local populations of humans." W.G. Hill, FRS, Professor of Animal Genetics, Formerly Dean of the Faculty of Science and Engineering, The University of Edinburgh.

Much of his research is summarised in his definitive book "Genetic Data Analysis" which has gone through two editions and has been translated into Russian and Chinese. The third edition is about to appear.

Bruce Weir's contributions in the use of DNA profiling for personal identification in forensic science are many fold. He brought his sharp mind and a body of statistical and genetic knowledge to a field that had been overpopulated by diligent scientists without these backgrounds. He led the effort to correct the erroneous sections in the first National Research Council (NRC) report on DNA methods in forensic science, 1991. The second NRC report, 1996, shows the results of this effort and completely adopted his methods and views. The 1998 book, Interpreting DNA evidence jointly authored with Ian Evett (retired

recently) from the United Kingdom Forensic Science Service, which is now considered the field text for forensic caseworkers, lawyers, judges and statisticians involved in DNA interpretation. He is truly a giant and guiding light in this field. I would consider him to have made the single largest contribution to this science of any person working in the last few decades. This is a view that would be shared by many other forensic scientists.

> "*Dr Weir has worked tirelessly to establish valid scientific foundations for assessment of forensic DNA evidence, and to educate forensic scientists and the wider community. In this controversial arena, he is almost unique in his steadfast adherence to the highest standards of scientific professionalism. He has established a unique position as a true expert in this field and has retained the respect of collaborators and adversaries alike.*" Elizabeth Thompson, Professor of Statistics and Biostatistics, University of Washington.

So I come to the OJ Simpson case. At that time (1995) I was in the United States working for Bruce on general theoretical issues in forensic science. We had analysed some of the data in the trial but the real reason that Bruce was chosen as an expert witness was his reputation for scholarly impartiality and the fact that we were the only people in the United States working on likelihood ratios for mixed DNA profiles. The 54 page report, the testimony and the result are all public record. Much can be said about the trial but I record my opinion that Bruce set a standard for scholarly interpretation of evidence that has yet to be equalled. More, however, he set a standard for the behaviour of witnesses that will be a lesson for forensic scientists for decades.

Bruce is an educator and visionary leader and one would suspect that his greatest achievements may yet to be seen as both he and his students continue the work. He is known throughout the world as not only a prolific researcher, but a generous and innovative educator as well. He has also established several highly successful research and training endeavours including the NCSU Summer Institute in Statistical Genetics and Web-based Courses.

> "*Dr Weir has also excelled as an educator. The statistical genetics group at N.C. State is one of the foremost groups of its kind in the world, and much of that is due to Dr Weir. ... One of the unique aspects of the statistical genetics program is the interaction with the Genetics department.*" Norman Kaplan, Mathematical Statistician, National Institute of Environmental Health Sciences.

> "*Bruce was a very supportive supervisor, from the time I made enquiries, through choosing PhD committees, courses, thesis topic, to writing up and defending the thesis. In addition to course requirements, he also got me involved in critiquing scientific writing and being exposed to practical aspects of data analyses which have been invaluable in my career.*" Ken Dodds, Agresearch, graduate student of Bruce Weir, 1984-1986.

These pages do not do justice to a career which I hope has yet to reach its zenith. But they are completely inadequate to describe the man. I have met a few great minds but in Bruce I have met both a great mind and a great man. I cannot begin to repay my own debt, both personal and intellectual, to him.

John Buckleton
Special thanks to James Curran, Ken Dodds,
Chris Triggs, Zhao-Bang Zeng, and Beth Weir
who provided material

NEW COLLEAGUES

Dr Martyn Nash
The University of Auckland

Dr Dominic Savio Lee
University of Canterbury

Dr Martyn Nash

Dr Martyn Nash has joined the Department of Engineering Science (and the Bioengineering Institute) as a Lecturer. He completed a BE in Engineering Science followed by a bioengineering PhD, supervised by Peter Hunter (Engineering Science) and Bruce Smaill (Physiology), on mechanics and material properties of the beating heart. Martyn has just spent six years as a post-doctoral research scientist in Physiology at Oxford University, working with Professor David Paterson on experimental and clinical epicardial and body surface ECG mapping. Martyn lists his primary research interests as cardiac electromechanics modelling; experimental/clinical ECG imaging and analysis; mammographic deformation modelling.

Don Nield

Dr Dominic Savio Lee

Dominic Savio Lee received the MSE and PhD degrees in Mathematical Sciences from the Johns Hopkins University in 1993 and 1996 respectively. His doctoral dissertation was on statistical resampling methods. From 1996 to March 2003, he worked as a Statistical Scientist at DSO National Laboratories in Singapore, where he applied probabilistic and statistical ideas to signal and image processing. His research interests are in computational statistics, Bayesian statistics, probability models and stochastic processes.

Charles Semple

Dr Matt Visser
Victoria University
of Wellington

Dr Yinhuo Zhang
Victoria University
of Wellington

New Colleagues at Victoria University of Wellington

Victoria University has recently acquired two new members of its academic staff in Mathematics, the first such appointments in over a decade. They fill vacancies arising from the retirement of Chris Grigson and the departure of Vladimir Pestov to a position in Canada.

Dr Matt Visser

Dr Matt Visser has been appointed Reader in Mathematics. He graduated from VUW with an MSc in Mathematics in 1981, and completed a PhD in Physics at Berkeley in 1984. After holding post-doctoral positions at the University of Southern California and the Los Alamos National Laboratory he moved to Washington University, St. Louis, where he was Research Associate Professor at the time of his return to New Zealand. His research interests are in differential equations and modelling applied to quantum physics, cosmology, analogue gravity, black holes, and the like. In addition to numerous papers, Matt is the author of the book "Lorentzian Wormholes–from Eisnstein to Hawking", and co-editor of the recent book "Artificial Black Holes". He is principal investigator on the Marsden funded project "How generic is Einstein's theory of general relativity?" and associate investigator on another Marsden project called "Probing brane world cosmologies".

Dr Yinhuo Zhang

Dr Yinhuo Zhang, who has taken up a lectureship, is an algebraist who was born and raised in China. He graduated MSc from Jiangxi Normal University in 1989 and obtained his PhD in 1993 from the University of Antwerp, Belgium, with a thesis on Hopf Galois theory for non-commutative algebras. After holding post-doctoral fellowships at Antwerp and Leuven in Belgium he was a visiting fellow at the Max-Planck Institute for Mathematics in Bonn, Germany before taking up a lectureship at the University of the South Pacific in Fiji. Yinhuo's research interests include representation theory of Hopf algebras and quantum groups, Galois theory, Brauer groups, non-commutative algebra and geometry, and coding

theory and cryptography. He is involved in a large European Science project on non-commutative geometry and is writing a book on coalgebras.

<div align="right">Rob Goldblatt</div>

BOOK REVIEWS

<div align="center">SPRINGER-VERLAG PUBLICATIONS</div>

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

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

Audin M, Geometry. 357pp.
Auslender A, Asymptotic cones and functions in optimization and variational inequalities. 265pp.
Barucci E, Financial markets theory. 467pp.
Bonnans JF, Numerical optimization. 423pp.
Capasso V (ed), Mathematical modelling for polymer processing 320pp.
Cohn PM, Basic algebra. Groups, rings and fields. 466pp.
Cohn PM, Further algebra and applications. 452pp.
Dana R-A, Financial markets in continuous time. 324pp.
Estep D, Practical analysis in one variable. 621pp.
Gelfand SI, Methods of homological algebra. (2nd ed) 370pp.
Goldschmidt D, Algebraic functions and projective curves. 179pp.
Grabmeier J, Computer algebra handbook. 638pp.
Gras G, Class field theory: from theory to practice. 492pp.
Gros M, Calabi-Yau manifolds and related geometries. 239pp.
Hildebrandt S (ed), Geometric analysis and nonlinear partial differential equations. 673pp.
Jacod J, Probability essentials. (2nd ed) 254pp.
Jacod J, Limit theorems for stochastic processes. (2nd ed) 661pp.
Jech T, Set theory. (3rd rev. ed) 769pp.
Jost J, Postmodern analysis (2nd ed). 367pp.
Kabanov Y , Two-scale stochastic systems. 266pp.
Langtanen HP, Computational partial differential equations. (2nd ed) 855pp.
Lebedev LP, Functional analysis in mechanics. 238pp.
Lee JM, Introduction to smooth manifolds. 628pp.
Maclachlan C, The arithmetic of hyperbolic 3-manifolds. 463pp.
Marker D, Model theory: an introduction. 342pp.
Martinet J, Perfect lattices in Euclidean spaces. 523pp.
Murdock J, Normal forms and unfoldings for local dynamical systems. 494pp.
Nestruev J, Smooth manifolds and observables. 220pp.
Osher S, Level set methods and dynamic implicit surfaces. 273pp.
Polster B, The mathematics of juggling. 226pp.
Reed BA (ed), Recent advances in algorithmic combinatorics. 351pp.
Robdera MA, A concise approach to mathematical analysis. 362pp.
Schattschneider D, M.C. Escher's legacy. 458pp.
Shafarevich IR, Discourses on algebra. 276pp.
Sigler L, Fibonacci's Liber Abaci. 636pp.
Stillwell J, Elements of number theory. 254pp.
Tits J, Moufang polygons. 535pp.
Van der Put M, Galois theory of linear differential equations. 438pp.
Winkler G, Image analysis, random fields and Markov chain Monte Carlo methods. (2nd ed) 388pp.
Woodhouse NMJ, Special relativity. 192pp.

<div align="center">
Computational Line Geometry
by H. Pottmann and J. Wallner, (Mathematics and Visualization),
Springer-Verlag, New York, 2001, 563pp, Euro 74.95. ISBN 3-540-42058-4.
</div>

This volume appears in the Springer series entitled Mathematics and Visualisation. The authors were initially motivated by their interest in a wide variety of practical problems in engineering and geometric design to attempt to write a book on classical geometry and applications to geometric computing. This presented itself as too ambitious a goal, so they wisely settled on a more restricted theme, that of computational line geometry. It is clear nonetheless that they were keen to capture the richness of the

geometrical setting. The result is that, while maintaining line geometry and the associated computational methods as central, the book touches on a wide variety of geometries and geometrical methods.

The applications come from numerous areas: geometric design, robotics, surface milling and machine cutting, geometrical optics, statics, kinematics and motion planning. However, it is the geometry that rules and guides the structure of the book. The applications are woven into chapters whose themes are different aspects of line geometry. The computational problems that are addressed are typically data fitting, interpolation, approximation and parametrisation.

Line geometry concerns the set of lines in three-dimensional space. While the applications occur generally in Euclidean space, projective geometry provides the best framework and the book begins with Arthur Cayley's dictum that "All geometry is projective geometry". The first chapter establishes the geometric foundations. It includes a relatively lengthy introduction or tutorial in projective geometry, emphasising the importance of homogeneous coordinates and linear algebra in this computational setting. There is also a briefer introduction to other relevant and/or interesting geometries: affine, equiaffine, equiform and Cayley-Klein. Also in this chapter are sections on differential geometry, algebraic geometry and rational curves and surfaces for geometric design. Computation of invariants is emphasised. The algebraic geometry section is done in the spirit of Gröbner bases. This fits the computational focus, but though the associated techniques are certainly used in, for example, robotics research they make scant appearance throughout the rest of the book. By contrast, the material on Bézier curves and surfaces and NURBS provides a central theme for subsequent chapters.

It is in Chapter 2 that the beautiful idea of representing the lines in projective 3-space as a quadric hypersurface (the Klein quadric) in P^5 is introduced. Rather than the classical ad hoc approach to Plücker coordinates prevalent in the engineering literature, this is done using exterior algebra and the proper generalisation to Grassmann varieties is presented. This subject is suffused with fascinating constructions and the Study sphere representation of the set of oriented lines (or equivalently Euclidean motions or dual spherical motions) using the ring of dual numbers is described here.

Much of the classical geometry of lines concerns linear complexes: the intersection of the Klein quadric with a projective hyperplane. See, for example Jessop's (1903) *Treatise on the Line Complex*. Here, the line complex is defined in terms of a null polarity, thus emphasising the importance of the projective viewpoint. The classical kinematic interpretation of a linear complex is as the set of normals to the helical trajectories of a screw motion. This gives physical meaning to the fundamental invariant p, the pitch. Pottmann and Wallner present the set of line complexes as the natural description of the projective 5-space that contains the Klein quadric. Although they introduce Ball's idea of screw theory, they thereby ignore more recent development of this theory by Hunt *et al* which represents this ambient space more naturally as screw space, foliated by the family of pitch quadrics.

In the following chapters, a number of themes around line geometry are developed: approximation in line space and fitting of linear complexes in Chapter 4; ruled surfaces, including their differential and algebraic geometry in Chapter 5. The computational theme is picked up in fitting by Bézier surfaces and other approximations of and by ruled surfaces. The importance of offset surfaces in milling and machining comes to the fore. Chapter 6 concentrates on the special case of developable surfaces. Practical descriptions by means of Taylor expansions and their connection to the geometry of the surface, more on Bézier and NURBS are given. An interesting section on the cyclographic mapping and Laguerre geometry with applications in optics are here.

The final two chapters concern line congruences and complexes-2- and 3-parameter families of lines in the Klein quadric (not necessarily linear)–and projections of the Klein quadric and groups of motions (kinematic mappings) which enable these spaces to be visualised in a variety of ways.

There is a vast amount of fascinating geometry of all sorts in this book. The topics are perhaps somewhat eclectic–they mirror the primary interests of the authors–but, because the motivation is to develop the geometry that applies to real world problems, the subject is far from monolithic and is open to interpretation. The ideas here build up layer upon layer. In the end, the authors have been mostly successful in sustaining their central theme, despite the need to weave together projective, differential, algebraic and metric geometry. They have also presented the mathematics in a predominantly modern way. That is important because there exist in the engineering literature archaeological remnants of outdated notation and concepts. This is not however a pure mathematical work and the authors have, for example, overlooked recent advances in singularities (Porteous, Bruce *et al*) and their application to differential geometry and kinematics.

The large number (264) of line diagrams are of very good quality and considerably enhance one's understanding. The smaller group of colour plates, by contrast, are divorced from the text, and don't seem to add much other than to meet the aims of the series title. Clearly the book is intended to be didactic but, though it abounds in examples and in many places invites the reader to fill in details or work through a

problem for themselves, I feel it would benefit (other than in adding to the already considerable length) from the inclusion of explicit exercises.

However these are limited and qualified criticisms of a book which is without doubt an important contribution to this growing branch of geometrical research.

Peter Donelan
Victoria University of Wellington

Mathematical Biology. I: an introduction
(3rd ed), by J. D. Murray, Interdisciplinary Applied Mathematics, 17,
Springer-Verlag, New York, 2002, 551pp, Euro 44.95. ISBN 0-387-95223-3.

Mathematical biology, standing at the interface of the two disciplines, involves the use of mathematical ideas to further understand biological processes. Both biologists and mathematicians benefit from the interaction; biologists have access to the abstraction and description of qualitative dependence on parameters that are naturally part of mathematics, and mathematicians have access to a vast array of interesting problems to tackle.

Jim Murray's "Mathematical Biology", first published in 1989, was written to outline some of the accepted mathematical treatments of a variety of biological problems. The problems ranged from population dynamics to Hodgkin and Huxley's theory of action potential generation and the geometric patterning of seashells. The mathematical techniques presented covered the spectrum from delay-differential equations, through singularly perturbed ODEs to time-dependent PDEs in two spatial dimensions.

Much of the book can be described as the application of deterministic nonlinear dynamical systems theory to specific biologically-inspired problems. Older topics such as predator-prey interactions and reaction-diffusion PDEs are covered, as are population dynamics and coupled oscillators. Some of the less well-known topics covered include an analysis of the Belousov-Zhabotinskii reaction and the dynamics of infectious diseases, including HIV.

In this third edition, Murray has split the contents of the second edition [4] (which was nearly 800 pages in length) into two volumes, of which I am reviewing the first. He has placed the simpler concepts in the first volume, reserving the more complex ideas for the second volume (subtitled "Spatial models and biomedical applications"). In addition, Vol. I contains new chapters on temperature-dependent sex determination (TDSD), modelling marital interactions and the use and abuse of fractals. It also includes a number of new sections detailing recent work on specific topics. The bibliography has been expanded and now contains nearly 600 references.

Of the new chapters, the one on TDSD is based on the observation that alligator eggs incubated at low temperatures tend to hatch females, while those at higher temperatures tend to hatch males. Murray then assumes a temperature gradient from cool marsh to warm levees and investigates the resulting male/female density profiles. He also investigates the effects of taking the age structure of the populations into account and discusses some interesting conclusions about the steady state female/male ratio. The chapter on marital interactions describes new work by Murray and others that is still in the developmental stage. The underlying assumption is that the success or otherwise of a marriage is largely determined by the difference between the number of positive comments and the number of negative comments by both partners (measured for example, during a 15 minute discussion). While some may challenge the validity of the conclusions, it certainly contains some intriguing ideas. The chapter on fractals introduces some basic ideas and warns against concluding that simply because a computer-generated fractal looks like a tree/cell/patch of lichen, the former does not provide a biological explanation for the latter.

The book is very accessible, with plenty of clearly-written text between the many equations. There are many black-and-white figures, all of high quality. Indeed, for the reader with some mathematical background and an interest in biological processes, it could be viewed as a recreational read, which is not often the case with maths textbooks. The book does not assume any particular biological knowledge, as each chapter starts with a short discussion of some of the relevant biology and includes recommendations for further reading. Most chapters close with up to ten exercises at the advanced undergraduate/graduate level.

The second edition, published in 1993, was necessarily selective in its coverage, since at the time of its writing it was impossible to touch on all topics that could be thought of as mathematical biology. With the explosion of interest in various aspects of the subject, that is even more the case now, and books like the one under review are now being replaced by specialist texts such as "Theoretical Neuroscience" by Abbott and Dayan [1], Kot's "Elements of Mathematical Ecology" [3], and Keener and Sneyd's "Mathematical Physiology" [2]. That said, this third edition would provide an excellent textbook for an

applied maths or nonlinear dynamics course at either advanced undergraduate or graduate level, since it has no shortage of examples to motivate or demonstrate the particular concept being discussed.

In summary, any mathematician considering collaborating with a biologist, or having the slightest interest in mathematical biology, should read this book.

[1] L. F. Abbott and P. Dayan. Theoretical Neuroscience: Computational and Mathematical Modeling of Neural Systems. MIT Press, 2001.

[2] J. Keener and J. Sneyd. Mathematical Physiology. Springer-Verlag, 1998.

[3] M. Kot. Elements of Mathematical Ecology. Cambridge University Press, 2001.

[4] J. D. Murray. Mathematical Biology (second, corrected edition). Springer-Verlag, 1993.

Carlo Laing
Institute of Information and Mathematical Sciences
Massey University

Modeling and Simulation in Medicine and the Life Sciences

(2nd ed), by Frank. C. Hoppensteadt and Charles S. Peakin, Texts in Applied Mathematics 10, Springer-Verlag, New York, 2000, 354pp, Euro 59.95. ISBN 0-387-9572-9.

The series to which this book belongs is pitched at "advanced undergraduate and beginning graduate courses". The authors state in the preface that their purpose is to "illustrate how mathematics can be used" and to "make available to students having at least one term of calculus topics in the life sciences and medicine that have benefited from mathematical modeling and analysis". The first five chapters describe physiological systems: blood circulation, the lungs, cell membranes, the kidney and muscle mechanics. Each system is presented accessibly, with schematic diagrams of the main components and their interactions and a clearly written text taking the reader through a series of equations that build up the model. Each chapter starts simply, and adds layers of complexity as realistic questions relating to the system are addressed. Numerical schemes for analyzing the models are developed and presented as Matlab programs. Finally, some numerical experiments are suggested so that the student can explore features of the models. The remaining five chapters discuss neural systems, population dynamics, genetics, epidemiology and population growth and dispersal. Each of these chapters present the principal ideas of the topic, with relevant equations. The book concludes with two short appendices: 'Getting started with matrices and MATLAB' and 'Background on random processes'. Overall the book is clearly written and produced to the high standard that one expects of Springer. It fulfils the promise in the title.

So, why is it that I don't like this book? The disappointment set in when I realized that I had not taken sufficient notice of its title. This is a book about modeling and simulation. The first half in particular is very good on the process of model development, but once that has been achieved the model is explored numerically. There are some exceptions, for example the section on cascades of nephrons in Chapter 4 utilises some approximations to make the model tractable. The later chapters are more mathematically satisfying, especially the treatment of age structures in Section 7.2 and the overview of genetics in Chapter 8, but overall the presentation of mathematical ideas is lacking. Sometimes this lack comes across as sloppy, as in Chapter 1 where a heartbeat is described as having period T, and we are then told that diastolic arterial pressure is Psa(T) and systolic arterial pressure is Psa(0), which would imply that they are equal. The accompanying figure shows the pressure to be discontinuous at integer values of T, the rigorous use of Psa(T-) and Psa(0+) could have been used here to introduce some concept of limit. Sometimes the lack is more serious, such as the glib description of a partial derivative in Chapter 4, or the dreadful statement: "The determinant is defined in a complicated way that we do not present here, but Matlab can often compute it quickly" in Appendix A. And sometimes the lack of mathematical presentation results in a sadly missed opportunity, such as numerically exploring the Hodgkin-Huxley equations to demonstrate the existence of a threshold, or the use of terms bifurcation and chaos without adequate explanation. Finally, I cannot let the authors get away with describing equation (9.2.2) as the Kermack-McKendrick model, or with the inadequacy of Chapter 9 on epidemics whose latest reference is sixteen years old.

In conclusion, this is a well-written, beautifully produced book that could help to convince life scientists that mathematical modelling was useful in their discipline, and give them the impression that model analysis means computer simulation. Its major defect is that it is not a mathematics book.

Mick Roberts
Institute of Information and Mathematical Sciences
Massey University

André Weil, *The Apprenticeship of a Mathematician*,
Birkhäuser, Basel, 1992.

Anita Burdman Feferman, *Politics, Logic, and Love: the Life of Jean van Heijenoort*,
A K Peters, Wellesley, 1993.

These two mathematician were both French, were both of similar ages (Weil 1906-1998, van Heijenoort, 1912-1986), and were both educated at the renowned Lycée Saint Louis in Paris. Weil was a member of the Bourbaki group and later professor at the Institute for Advanced Study, Princeton; van Heijenoort was a respected historian of logic at Stanford and editor of the monumental *Source Book in Mathematical Logic*. Yet their lives followed very different courses. Only once did they nearly intersect, at the end of 1933, when André Weil's sister Simone arranged for Leon Trotsky to sleep in his studio. Trotsky would have been spirited there by his secretary and bodyguard, Jean van Heijenoort.

Born to a dirt-poor disenfranchised French family, van Heijenoort came along just late enough to take advantage of universal education. He was identified as a genius and given complete scholarships everywhere. By 1932 he was a *taupin* (mole), a student in the special mathematics programme at the Lycée Saint Louis–the humanities students being known as *les cagneux*, the lazy dogs. The academic standard was rigorous, the workload enormous; when *les cagneux* had a day off, *les taupins* remained locked up, solving problems at the blackboard for the collected mathematics teachers of Paris. Only on Sundays were the boarders let out to savour the delights of Paris, from the surrealist bookshops of the Boulevard Saint-Michel to the avant-garde theatre L'Atelier, where at a protest van Heijenoort met a contact who was to lead him to Trotsky. And when, in October 1932, the leader called, van Heijenoort "without a second thought" forsook his studies and became a full-time revolutionary.

For the next seven years he followed Trotsky from Turkey to France to Norway to Mexico. In Mexico he fell in with the famous ménage of the communist muralist Diego Rivera, his wife the artist Frida Kahlo, and the surrealist André Breton. He was getting some much-needed breathing space in New York when, in 1940, Trotsky got the ice pick.

Now he enrolled as a graduate student at New York University and increasingly walled off his previous life from his new colleagues. Now 33, he was perhaps too old to make any fundamental contributions to mathematics, but his scrupulous earlier education did not desert him. To the end of his life he was willing to embark on huge projects at a moment's notice. As usual, one life was not enough: he found another in the Bohemian gatherings in Greenwich Village, and later with Jackson Pollock and Willem de Kooning. Now Jean van Heijenoort's life began to resemble more that of a conventional modern academic: visiting appointments, prestigious editorships, frequent international conferences. But there is still more to his personality: he wasn't just a silent, pedantic scholar, not just a revolutionary with the Fourth International–he was also an outrageous lover, leaving a trail of broken hearts and divorces behind him in each country. Revolutionaries of all nations, Frida Kahlo, American freshers, and landladies all succumbed. In time the patterns repeated, the complications grew, until finally in 1986, he went to the aid of an increasingly deranged ex-wife, who shot him in his sleep and then committed suicide.

With material like this, a biography can hardly go wrong. And we get the inside story, the psychological analyses that van Heijenoort would never have produced himself. But I still think the intellectual side of the story is missing: just what were these doctrines that inspired the young Jean to suppress his studies and his relationships? What was his work in logic, and how did he view it in relation to the rest of his life? (The history of logic may not compete with Trotsky or the surrealists, but it has produced the odd good anecdote.) I could go and read a history of Trotskyism, or the rather dry scientific appendix by Soloman Feferman, but a biography is supposed to integrate the personal and the external.

And here, although his material is more down-to-earth, André Weil has the advantage. He doesn't have to psychoanalyse, he can just show himself. Emotionally, *The Apprenticeship of a Mathematician* is the more fulfilling read.

Weil had quite a different time at school than van Heijenoort and he recalls his education lovingly. While van Heijenoort hung out at surrealist bookshops, Weil spent his pocket money on fifteenth century editions of the Greek classics and witnessed a memorable discussion between Cartan and Einstein. Officially enrolled as a graduate student at the Ecole Normale Supérieure, Weil discovered instead a "natural aptitude for the art of tourism," which was to lead him freewheeling all over Europe, an interwar Europe suffused with the glow of nostalgia: "Best of all, I was young."

Weil's giant confidence and giant ego could not, one feels, be contained in Europe for long, and soon he was off to teach in India. As a non-Englishman he was in a good position to observe the independence struggles, and he befriended Zakir Husain, later president of India, and met Nehru and Gandhi. He claims his early education was so good that he could later work in any circumstances, needing little personal or

institutional support. Indeed, during World War II his belief (based on a reading of the *Baghavad Gita*) that he was not destined for cannon fodder landed him in a French prison cell, where he did some of his best work.

For his mathematical work, the period from 1932 to 1939, when he was again trotting Europe visiting the great mathematicians, provides the richest material. Whatever you think of Bourbaki now, it's hard not to get caught up in the heady atmosphere of a group of young friends (Weil was still in his twenties) setting out to upset the old fogies at the Collége de France. As an autobiography, this is definitely only one side of the story–Serge Lang, for example, has claimed that the lack of references in Weil's papers is due to a deliberate effort to hide the work of his predecessors.

I don't know if André Weil and Jean van Heijenoort ever met, in the calmer postwar world of conferences and scholarship. Certainly it's hard to imagine them hitting it off, given their disparate personalities. Weil was very close to the political struggles which dominated van Heijenoort's early life: in 1936, for example, while he was writing up general topology for Bourbaki from a hotel in the Pyrenees, his sister Simone was being wounded on the Aragon front. A few chance moments–had Jean had time to savour the freedoms and opportunities of the Ecole Normale, for example–and their lives could have run very different courses.

Robert McLachlan
Massey University

CONFERENCES

SEEM 4

The fourth conference on Statistics in Ecology and Environmental Monitoring took place at the University of Otago during the week 9-13 December 2002. The conference was organized by the Centre for Applications of Statistics and Mathematics, in the Department of Mathematics and Statistics. The theme was "Population Dynamics: The Interface Between Models and Data", the aim being to bring together ecologists, statisticians, fisheries scientists and modellers in order to discuss common issues in the modelling of populations dynamics. The invited speakers were Hal Caswell (Woods Hole Oceanographic Institution, USA), Jean-Dominique Lebreton (Centre for Functional and Evolutionary Ecology, CNRS, Montpellier, France) and Byron Morgan (Professor of Applied Statistics, University of Kent, UK). Approximately 80 delegates took part, coming from Europe, USA, Australia and New Zealand. There was a good mix of ecologists, applied statisticians and modellers. In addition, 25 delegates took part in a three-day workshop on matrix population models held prior to the conference, run by Hal Caswell and Jean-Dominique Lebreton. The conference proceedings will appear in a forthcoming issue of the Australian and New Zealand Journal of Statistics. As is usual with smaller conferences, there was plenty of opportunity for people to interact in a way that is not possible at larger events. We are now looking forward to the next conference in 2005.

David Fletcher
University of Otago

THE OTAGO INTERNATIONAL CONFERENCE ON PERMUTATION PATTERNS

The conference took place 10-14 February, 2003 at the University of Otago. It was attended by 24 delegates, 17 of whom were from overseas (7 from the USA, 2 from Canada, 3 from Israel, 2 from Sweden, 1 from Finland, 1 from the UK, 1 from Spain). It was generously supported by the NZIMA with a grant that enabled some younger researchers to attend. The "key note" speaker was Herbert Wilf, one of the founders of the subject. The Electronic Journal of Combinatorics is publishing a special issue to mark the conference.

Permutation patterns is a topic in combinatorics that has grown by leaps and bounds in the last 10 years. It has applications in computer science, algebraic geometry, and two-dimensional data analysis, as well as providing a feast for combinatorialists. One of the reasons for it becoming so much studied is that the principal concept and central questions are so accessible. Suppose p and s are two permutations (think of them as lists of integers in some order). Then p is called a pattern within s if some subsequence of s 'looks like' (is order isomorphic to) p. For example 1,3,2,4 is a pattern within 3,1,6,4,2,5 because the latter permutation has the subsequence 3,6,4,5 whose terms are in the same order as 1,3,2,4. A typical (as yet unsolved) combinatorial question is "How many permutations of length n have no pattern of the form 1,3,2,4?".

The conference was so enjoyed by the participants that plans are already underway for a second one

which will take place in July 2004 at the University of Victoria (Canada) and a third in April 2005 at the University of Florida. Participants from overseas were keen to repeat the New Zealand experience and we hope that the fourth conference will once again take place at Otago in 2006; some care will be needed to reproduce the same glorious weather!

Mike Atkinson

NZMRI SUMMER WORKSHOP: NAPIER 2002
STOCHASTIC PROCESSES WITH APPLICATIONS TO BIOLOGY, MEDICINE AND STOCHASTIC NETWORKS

Over 70 people, including 22 graduate students and a number of recent PhDs, attended the meeting in January 2002, to hear a fine group of six distinguished speakers, all of whom were world renowned mathematical statisticians and probabilists. Student participants included Andreas Berg, Bo Cai, Nicoleen Cloete, Carl Donovan, Derek Law, Brad Luen, Monique MacKenzie, Nicolette Moir, Matt Pawley, Debasish Roy, Ru-Shuo Sheu, David Welch, and William Wright (Auckland); Robin Turner (Canterbury); Todd Rangiwhetu, Aleksandar Stojmirovic, and Guohua Wu (Victoria); and Paul Gardner, Lars Hansen, and Padma Senerath (Massey).

Each of the speakers gave a series of two 90 minute lectures, with at least the first being easily accessible to graduate students. In addition there was a series of introductory tutorials given by Geoff Nicholls, Wiremu Solomon and Geoffrey Pritchard to provide basic mathematical background for the main talks.

Adrian Baddeley (Western Australia) spoke on spatial point patterns, data analysis and modelling. He began by describing various distance methods for point patterns, and some of the point process models in current use, and then showed how to fit models using the maximum pseudolikelihood approach recently proposed by Baddeley and Turner. This has been implemented in software, using the statistical package R (or S-Plus), and the talk was packed with illustrative examples. The talks are available on the web at http://www.maths.uwa.edu.au/~adrian/talks.html.

David Brillinger (Berkeley) spoke on the use of stochastic differential equations to model animal motion. Brillinger's approach is to assume that animals are moving in a potential field that controls their direction and speed of motion. The field may have points, lines or regions of attraction or repulsion and may include barriers. Stochastic differential equations are used to include random variation and the effect of attractors and repellors not captured by the potential function.

Steve Evans (Berkeley) gave two lectures which presented many deep and beautiful results on the eigenvalues of random matrices. For unitary matrices, the eigenvalues lie on the unit circle of the complex plane, and Steve discussed the distribution of the eigenvalues on the unit circle, and presented a central limit theorem for the number of eigenvalues falling in an arc. He also explained the connections between the eigenvalues of random matrices (regarded as a point process), the determinants and permanents of the matrices, and fermion and boson point processes.

Ian McKeague (Florida State) gave an up to date review of recent developments in Markov Chain Monte Carlo methods and illustrated their application to a variety of challenging problems in Bayesian statistics. The illustrations included: single-index models, which offer a flexible semiparametric regression framework for high-dimensional predictors; hazard function regression modeling for survival data; spatial point process models for disease clustering; an ocean circulation inverse problem. The talks are available at http://stat.fsu.edu/~mckeague/ps/.

Ruth Williams (University of California at San Diego) spoke on the performance and control of stochastic networks using diffusion approximations to model the networks. Her first lecture was on diffusion approximations to multiclass queueing networks via state space collapse, and contained some discussion of Skorohod problems associated with these models. The second lecture was a survey of the very latest work on the control of stochastic processing networks, concentrating on dynamic scheduling for stochastic networks in heavy traffic. Copies of her talks can be found at http://www.math.ucsd.edu/~williams/research.html.

Keith Worsley (McGill) talked about the Euler characteristic of the excursion set of a random field and its use in the analysis of positron emission tomography (PET) images, functional magnetic resonance images (fMRI), galaxy density maps and the cosmic microwave background. These images are modelled as a Gaussian random field, and the excursion set is the set of points where the field exceeds some fixed threshold value. He discussed recent results in the geometry of random fields including: boundary corrections for the expected Euler characteristic, which lead to highly accurate P-values for the field maximum; extensions to chi-squared, T and F fields; searching over smoothing kernel width as well as location, in order to estimate the extent of the signal; and knots in the excursion set.

David Gauld

NEW ZEALAND MATHEMATICS RESEARCH INSTITUTE
SUMMER WORKSHOP 2003
New Plymouth, 4-11 January 2003

The theme of the meeting was Combinatorics and Combinatorial Aspects of Biology. Talks were held at the Plymouth International Hotel in New Plymouth and attendees were housed at a number of motels in the New Plymouth area. Talks were held from Sunday to the following Saturday with Wednesday being kept free. As usual the daily program was lectures in the morning and in the evening with afternoons being kept free to work on mathematics or to relax and enjoy the stunning weather. David Gauld led an intrepid group of mountaineers on a summit attempt of Mt Taranaki on Wednesday.

We had an outstanding group of speakers. These were Karl Broman (Johns Hopkins University, Recombination Mapping); Andreas Dress (University of Beilefeld, Overview of Combinatorial Biology); Martin Grohe (University of Edinburgh, Logical Aspects of Graphs); Mike Hallett (McGill University, Parametric Aspects of Computational Biology); Lior Pachter (University of California, Berkely, Genefinding); Neil Robertson (Ohio State University, The Graph Minors Project); Paul Seymour (Princeton University, The Perfect Graph Theorem); Terry Speed (University of California, Berkeley, Mathematical Aspects of Gene Expression); Richard Stanley (MIT, Enumerative Combinatorics); and Tandy Warnow (University of Texas, Mathematical Aspects of Phylogeny).

Overall the standard of talks was excellent. A highlight of the meeting was the breadth of the talks, ranging from very applied to quite pure. This diversity certainly made for interesting and stimulating sessions. Diversity was also reflected in the attendees who included pure mathematicians, statisticians, computer scientists and biologists.

About 90 people were accommodated for the meeting; this included families of attendees. Typically talks had an attendance of about 55. There were about 20 graduate students.

Rod Downey
Geoff Whittle

Conferences in 2003

June 2-4 (Melbourne) **WoPLA'03: Workshop on Parallel Linear Algebra**
website: http://www.iciam.org

June 18-20 (Sydney) **Workshop on Computational Arithmetic Geometry**
email: bruin@maths.usyd.edu.au
website: http://magma.maths.usyd.edu.au/~bruin/Workshop

July 7-11 (Sydney) **Fifth International Congress on Industrial and Applied Mathematics**
(including the 6th Australia-New Zealand Mathematics Convention, which incorporates both the New Zealand Mathematics Colloquium and the Annual Meeting of the Australian Mathematical Society)
website: http://www.iciam.org

July 13-16 (Magnetic Island, Queensland) **Australasian Workshop on Mathematics in Combustion 2003**
website: http://www.ma.adfa.edu.au/~gnm/AWOMIC03/awomic03.html

November 23-27 (Queenstown) **Delta '03**
website: http://www.maths.otago.ac.nz/delta03

Conferences in 2004

January 3-11 (Nelson) **NZMRI meeting on Computational Algebra, Number Theory and Geometry**
website: http://math.auckland.ac.nz/conferences/2004/NZMRI/

January 12-16 (Nelson) **NZIMA meeting on Logic and Computation**
website: http://www.clk.vuw.ac.nz/LandC.shtml

January 18-22 (Dunedin) **Australasian Computer Science Week**
website: http://www.cs.otago.ac.nz/acsw/

February 9-14 (Wellington) VIC 2004}
website: http://www.mcs.vuw.ac.nz/~mathmeet

February 16-20 (Whakapapa) **Annual New Zealand Phylogenetics Meeting**
website: http://awwmassey.ac.nz/

APPLIED MATHEMATICS WORKSHOP
SOUTH KOREA
Industrial Mathematics Initiative 2003

You are warmly invited to attend the Industrial Mathematics Initiative 2003, to be held at the Korean Advanced Institute of Science and Technology, Taejon, South Korea, from 1-3 July 2003. Contributed talks are welcome, with a deadline for titles and abstracts of 1 June. Come to Korea on your way to ICIAM in Sydney!

Details may be viewed on the website: http://parter.kaist.ac.kr/imi/

The aim of the initiative is to foster contacts between Korean industry and the applied mathematics community for mutual cooperation and benefit. The initiative is intended to prepare the way for the holding of full problem-solving workshops in the region whereby the many powerful tools of mathematics are brought to bear on problems arising in industry, including the biological and financial areas. Illustrative case studies from previous successful interactions will be a major feature of talks presented at this meeting.

Main Themes: Bio-Mathematics, Communications and Networks, Electrical Impedance Tomography, Financial Mathematics, Mathematics in Medicine. The emphasis will be on case studies of industrial applied mathematics, with a broad interpretation of the term industrial.

The **invited speakers** are
S. J. Chapman (OCIAM, Oxford University, UK)
E. Cumberbatch (Claremont Graduate University, USA)
L. Forbes (University of Tasmania, Australia)
F. T. Luk (Rensselaer Polytechnic Institute, USA)
M. McGuinness (Victoria University of Wellington)
R. McKibbin (Massey University)
B. Van-Brunt (Massey University)
G. C. Wake (University of Canterbury & Massey University, New Zealand).

The Sponsors of this meeting are the Korean Advanced Institute of Science and Technology and the Royal Society of New Zealand (under the Memorandum of Understanding for scientific cooperation between South Korea and NZ).

NEW ZEALAND ASSOCIATION OF MATHEMATICS TEACHERS ANNUAL CONFERENCE 2003

The New Zealand Association of Mathematics Teachers is planning its 8th biennial conference, 8-11th July 2003 Hamilton, New Zealand.

Plenary Speakers Announced:

- Vaughan Jones
- Kaye Stacey
- Laurinda Brown
- John Edwards
- Jeff Witmer
- Charles Lovitt
- Harold Henderson
- Anthony Harradine

All enquiries to;
Kathy Paterson
Box 101, Cambridge
New Zealand
email: organiser@nzamt8.ac.nz
website: http://www.nzamt8.ac.nz/

FOURTH SOUTHERN HEMISPHERE SYMPOSIUM ON UNDERGRADUATE MATHEMATICS TEACHING

Queenstown, New Zealand

23-27 November 2003

Following the previous successful *DELTA conferences* the fourth DELTA conference is scheduled to take place in *Queenstown* amongst the spectacular natural scenery of New Zealand's premier tourist destination.

Conference Theme: FROM ALL ANGLES
Conference Venue: Rydges
Conference Dinner: Skyline restaurant

Local Organising Committee:

Department of Mathematics & Statistics
University of Otago
Email: igoodwin@maths.otago.ac.nz
Website: http://www.maths.otago.ac.nz/delta03
Tel: 64-3-479 7774 Fax: 64-3-479 8427

Invited Speakers are:

- Professor Johann Engelbrecht (University of Pretoria, Pretoria,South Africa)
- Professor Anna Sierpinska (Concordia University, Montreal, Quebec, Canada)
- Professor Lynn Steen (St Olaf College, Minnesota, USA)
- Professor Chris Wild (The University of Auckland, NZ)

There will be four panel discussions on the topics:

- **Technology and mathematics**, Janet Taylor, Bill Blyth, Mike Thomas, Ansie Harding.
- **Undergraduate mathematics**, Victor Martinez Luaces, Leigh Woods, Matt Regan, Patricia Cretchley.
- **Statistics**, Michael Bulmer, Megan Clark, Reina Nieuwoudt.
- **Bridging courses**, Barbara Miller-Reilly, Maritz Snyders.

MINUTES

Minutes of the 28th Annual General Meeting
5.45 pm Monday 2 December 2002
SLT-1, Mathematics Building, The University of Auckland

Present. Rod Downey (Chair), Shaun Hendy, Peter Fenton, Rua Murray, Bill Barton, Graeme Wake, Gaven Martin, Don Nield, David Alcorn, Paul Bonnington, Garry Tee, Nicoleen Cloete, John Butcher, Dennis McCaughan, Ken Pledger, Rick Beatson, Peter Donelan, Graham Weir, Ernie Kalnins, David Gauld, Mick Roberts, Robert McKibbin, Graeme Wake, Sean Oughton, Robert Goldblatt.

Apologies. Charles Semple, Geoff Whittle, Stephen Joe, Marston Conder, Mark McGuiness, Robert McLachlan.

1. **Minutes of 27th Annual General Meeting**
   It was moved (Gauld and Donelan) that the minutes of the 27th Annual General Meeting of the NZMS be accepted. The motion was carried.
2. **Matters arising from the minutes** (numbers refer to items of the 27th Annual General Meeting).

   4(e) The endowment fund is now taking donations. Donations so far amount to $1800. Rua Murray will investigate the publication of donors' names in the newsletter.

   5 The NZMS Fellows are now listed on the website.

   11(a) Rod Downey is still investigating the writing of on-line texts to build NZMS capital.

3. **Presidents report**
   a. The report was delivered to the meeting and will appear in the NZMS newsletter.
   b. It was moved (Barton, Murray) the report be accepted. The motion was carried.
   c. As demand for support for travel to ICIAM has been low, the NZMS has increased the maximum level of support available to $1000.
4. **Treasurer's report**
   a. The Treasurer's report was delivered to the meeting and the financial statements were distributed to the members.

b. It was moved (Murray and Goldblatt) that the statements be accepted. The motion was carried.
c. Dr Rua Murray outlined what had been discussed at the Council meeting the previous day:
    i. The NZMS will retain the current investment strategy as outlined in the Treasurer's report until 2004.
    ii. The endowment fund is now operating. Donations are tax-deductible and the names of donors will be reported in the newsletter. Peter Donelan suggested that the Council should solicit external donations. This will be looked into in the coming year.

5. **Membership Secretary's report and annual subscriptions**
   A report from the Membership Secretary, Dr John Shanks, was tabled. It was moved (Barton and McKibbin) that the report be accepted. The motion was carried.

6. **Nominations for four Council positions**
   a. The terms of office of Professor Graeme Wake, Dr Charles Semple, Dr Bill Barton and Dr Robert McLachlan have ended.
   b. Nominations received at closing date: Dr Tammy Smith (Massey), Professor Gaven Martin (Auckland), Dr Charles Semple (Canterbury) and Dr Mick Roberts (for incoming Vice-President, at Albany from January 2003).
   c. Dr Tammy Smith, Professor Gaven Martin and Dr Charles Semple were unopposed and duly elected to the Council. Dr Mick Roberts was also unopposed for the position of Vice-President and was duly elected.
   d. It was moved (Gauld and Hendy) to formally thank Professor Graeme Wake, Dr Charles Semple, Dr Bill Barton and Dr Robert McLachlan for their contributions during their time on Council. The motion was carried.

7. **Appointment of auditors**
   It was moved (Murray and Hendy) that the current auditors, McKenzie McPhail (4th floor, Farmers Mutual House, 68 The Square, Palmerston North), be reappointed for another year. The motion was carried.

8. **New Zealand Journal of Mathematics**
   The report was circulated to the members. It was moved (Goldblatt and McKibbin) that the report be accepted. The motion was carried.

9. **NZMS Visiting Lecturer 2002**
   It was noted that both Visiting Lecturer's in 2002 (Professor John Butcher and Dr Jim Galeen) were very successful.

10. **Forder Lecturer 2003**
    a. Professor Caroline Series is the Forder Lecturer for 2003. Shaun Hendy is coordinating her visit in September and October 2003.
    b. The British Council has declined to support the Forder Lectureship this year. David Gauld pointed out that it was the London Mathematical Society who originally suggested using the British Council to defray their costs.
    c. It was noted that each local department will be expected to provide three nights support for Professor Series during her visit to their centre.

11. **General Business**
    There were no items of general business.

The meeting closed at 6.30 pm.

NOTICES

THE NEW ZEALAND MATHEMATICAL OLYMPIAD COMMITTEE

The New Zealand Mathematical Olympiad Committee (NZMOC) was created in 1986 and received an invitation from Australia to send a New Zealand team to the 29th International Mathematical Olympiad (IMO), held in Canberra as part of the bicentennial celebrations of (European) Australia. Each year since 1988 the NZMOC has selected, trained and sent a New Zealand team to the annual IMO held in a different country each July.

We have had varying degrees of success, but generally we are regarded, by our colleagues from the 80 odd other countries represented at the IMO, as "punching above our weight". From time to time they express surprise that such a small country (in terms of population) is able to win medals on a regular basis. Last year, 2002, was the first time that one of our New Zealand team members won a gold medal at an IMO. Simon Marshall from Onslow College, Wellington, made history for us. It has taken NZMOC fifteen years of sending teams to the annual IMO before our first gold medal performance was achieved. Congratulations, especially to Simon, who worked hard over a three year period, and to the members of NZMOC for their dedication to training our teams over several years.

Over the 17 years of its life, the NZMOC has obtained sponsorship from several corporate sponsors. Apart from a small amount of Government sponsorship before 1990, New Zealand had the (dubious) distinction of being the only country regularly competing at the IMO which had no direct Government financial backing for a decade. It is gratifying to report that the situation has now been changed. The NZMOC has very recently been successful in a bid to the Ministry of Education's Program for Gifted and Talented Students. This backing has enabled us to confirm NZ's participation in the 44th IMO to be held in Japan in July 2003, despite having lost our most recent corporate sponsor late in 2001. We are still seeking corporate sponsorship for our activities. Here, it is a pleasure to acknowledge with thanks, the continued support of the NZMS over several years. Although the sums of money may be small compared to our budget, it is reassuring to have such support from the professional group(s). Of course, all participants in our activities make financial (and other) contributions. But without significant sponsorship, our activities would grind to a halt (as the NZ Physics Olympiad Committee's activities did several years ago). The recently formed Centre of Research Excellence, the NZ Institute of Mathematics and Applications (NZIMA), has followed a pattern set by MSRI and PIMS (its counterparts in California and Western Canada) in making a useful donation towards the work of the NZMOC. It is wonderful to receive such support from NZIMA.

Our committee members provide their time and effort on a voluntary basis. They would all say how much enjoyment and satisfaction they have received from their work for NZMOC. Members of our committee are typically university staff (some of them retired) and high school mathematics teachers. We are always looking out for new members. If you would like to know more about our activities, if you know of mathematically talented high school students who might enjoy a challenge, if you can suggest a possible sponsor, and especially if you would like to consider joining in (some of) our activities, then please contact us. You will be welcome.

Ivan Reilly
Chair
NZMOC
i.reilly@auckland.ac.nz

Alan Parris
President
NZAMT
pa@linwoodcollege.school.nz

NEW ZEALAND INSTITUTE FOR MATHEMATICS AND ITS APPLICATIONS
and the
CENTRE FOR MATHEMATICS IN INDUSTRY

Postgraduate Scholarships in Industrial Mathematics

Postgraduate Scholarships are available for support of students undertaking research degrees (Doctoral or Masters theses) in Industrial Mathematics. These awards are provided by the NZ Institute of Mathematics and its Applications (a recently-established Centre of Research Excellence).

Scholarships are available to support study on mathematical problems arising in industry (including the biological and financial industries) and are available from March 2003. The scholarships may be held at any NZ University that can provide appropriate supervision.

During the second half of 2003, a thematic programme in Industrial Mathematics will be held in New Zealand. Scholars will be expected to participate in regional applied mathematics workshops during that period, and also the ANZIAM (Australian and NZ Industrial Applied Mathematics) Mathematics-in-Industry Study Groups (MISG) which will be held in Auckland in January 2004 and 2005, as appropriate.

Candidates should enclose a full curriculum vitae, information about their proposed or current course of study, a statement from the proposed or current supervisor, as well as the name and contact details of at least one other referee. Selection will be made by a committee which is representative of the various industrial and applied mathematics groups within New Zealand.

Further details are available from:

Professor Robert McKibbin
Director, Centre for Mathematics in Industry
Institute of Information and Mathematical Sciences
Massey University, Albany Campus

Private Bag 102 904, North Shore MSC
Auckland, New Zealand
E-mail: R.McKibbin@massey.ac.nz
Phone: (64) (9) 443 9799 ext 41040

THE UNIVERSITY OF MELBOURNE
DEPARTMENT OF MATHEMATICS AND STATISTICS
RESEARCH FELLOW

Mathematical Biology

The position: A research position is available to work on a NHMRC grant, a collaborative project between the Department of Mathematics and Statistics and the Embryology Laboratory at Murdoch Children's Research Institute. The project is concerned with cell migration on an underlying tissue which is itself growing. For full details of the position, see http://www.ms.unimelb.edu.au/~kal/.

The person: Applicants should have a PhD in applied mathematics, physics, chemical engineering or a related field. Applicants should have a high level of mathematical modelling, analytical and numerical skills. Good written and oral skills are essential, as well as the ability to work in a team with both mathematicians and biologists.

The benefits: The position has a salary of $48,774-$52,356 p.a. (Research Fellow Grade 1) plus employer superannuation contributions of 9 percent.

Employment type: The position is a fixed-term position available for a period of three years.

Contact:

Associate Professor Kerry Landman,
tel: +61 3 8344 6762,
fax: +61 3 8344 4599,
email: k.landman@ms.unimelb.edu.au.

Applications: by 2 May 2003.

Quote position number: Y0012542.

All applications quoting position number to Deputy Principal, Human Resources, The University of Melbourne, Victoria, Australia 3010; fax +61 3 8344 6080 or email hr-applications@unimelb.edu.au. Applications must address the selection criteria and provide a detailed curriculum vitae by the closing date. Please include the names, phone and facsimile numbers and email addresses of three referees in your application.

The University of Melbourne is an equal opportunity employer.

MATHEMATICAL MINIATURE 20

Mathematics and Music

It is often said that mathematics and music go together. Although many mathematicians take a serious interest in music, and for that matter in other cultural pursuits, it doesn't always work the other way round. From my observations, I would say that it is quite rare for a musician to take a genuine interest in mathematics or, for that matter, in any science.

Today I want to write about two young mathematicians who have added enormously to my positive feelings about mathematics in New Zealand. They have in common also a great love of music.

One of the really great things about mathematics in this country is the annual colloquium. At least in its early days in the sixties, almost every mathematician in the country took part. The interests of the participants were remarkably diverse for such a small country but everyone seemed to get something out of being part of this annual gathering. Even though some of the early enthusiasm has now fizzled out, the days of greatness are far from over.

I didn't realise that Aroon Parshotam had a secondary interest in music until I heard him speak at the 2001

New Zealand Mathematical Colloquium in Palmerston North. He spoke on "Music as Applied Mathematics in Action", rather than on a topic arising from his professional work for the Landcare Research Institute. I believe that Aroon is all the better as a practical mathematician because of his many other interests, including music. Aroon is effective in his work not only because of his knowledge and training and experience but also because of his personality. He can talk sympathetically to anyone about anything. I believe he is especially effective as a mathematical scientist because he can engage with a potential client without allowing his specialist knowledge to become a barrier between them. The mathematical sciences need people like him -- people with the humanity associated with a love of music.

I have been privileged to have been one of the teachers of Ruby Chen, who like Aroon combines interests in mathematics and music. Ruby had her primary education in Taiwan; she told me that music was not given much importance in the education system there, because it is not perceived to be utilitarian in the sense that science and mathematics are. In fact classes scheduled for musical appreciation often drifted into other arguably more practical topics.

When Ruby was undertaking her secondary schooling in New Zealand she felt there was a better balance and she actively enjoyed both music and mathematics as parts of her education. She has become an accomplished exponent of the Gu Zheng, as well as of Western instruments. While doing her music degree, Ruby enrolled for a single paper in Applied Mathematics. She became fascinated again with this other great love of her intellectual life. Most especially, the idea of mathematical modelling impressed itself upon her. From this starting point she went on to complete a science degree to place alongside her music degree. Eventually, she completed an MSc thesis while still pursuing a career as a performing musician.

At the present time, Ruby is active as a musician more than as a mathematician. Does this mean we have lost her to mathematics now that her formal studies have been completed? Even though she may never have a career in mathematics, although I hope she does, this is hardly the point. The culture of mathematics is now part of her culture just as the culture of music will always be part of Aroon's. I once asked Ruby which of Mathematics and Music is the more important to her. She replied that they are both part of her life and it is difficult to say where one starts and the other ends. I suspect that Aroon would give a similar answer.

For x a positive real, but not an integer, let

$$\phi(x) = \frac{[x]x + 1}{x - [x]}$$

where $[x]$ is the integer part of x. For given x_0, define $x_1 = f(x_0)$, $x_2 = f(x_1)$, and so on. The sequence possibly terminates if for some n, x_n is an integer.

1. Is it true that the sequence terminates if and only if x_0 is rational?
2. Are the members of the sequence monotonically increasing and, if x_0 is irrational, is the sequence unbounded?
3. Is there any conceivable application of this sequence?

I turn 70 on the day I submit this miniature to the editor. When I first volunteered to write this one-page article three times a year I was looking for something to keep me busy during my leisurely retirement. There have been some spin-offs. The then editor of the New Zealand Mathematics Magazine asked if he might reprint one of my pieces and I decided it might be better re-written for a different readership. Thus began the Mathematical Apologies that I now write regularly for the Magazine. A few people overseas have told me they have discovered the Miniatures on my webpage and sometimes read them.

I am now starting to wonder if I have carried on with these enterprises long enough. My time in retirement is far from leisurely but I really enjoy writing these small jottings. My personal enjoyment alone, however, hardly justifies the effort. I would value comments from other people before deciding if I should keep on writing these one-page articles.

John Butcher, butcher@math.auckland.ac.nz

[]