

Bronwyn, farewell!!!

Bronwyn Webster, who does all the work in putting this Newsletter together, is leaving the Computer Science Office at Waikato for greener pastures—literally! She is starting a new venture in garden design. We'll miss her...

Ian Witten

Lincoln

Nathan Graham
 Technical Tutor

Victoria

Pavle Mogin
 Senoir Lecturer
 Database systems.

Mengjie Zhang
 Lecturer
 Artificial intelligence: data mining in image data, neural networks, genetic programming, computer vision and image processing.

Waikato

Appointments

Otago CS

Dr Michael Albert
 Lecturer (from December)
 Theory, particularly algorithms and data structures; combinatorial computing.

Iain Hewson
 Teaching Fellow (from December)

Simon McCallum
 Lecturer (from December)
 Artificial intelligence focusing on neural networks, in particular the study of memory.

Parviz Najafi
 Teaching Fellow (from February)

Nathan Rountree
 Lecturer (from September)
 Data mining, software engineering techniques, alternative language paradigms.

Donnelle Willcocks
 Teaching Fellow (from January)

Otago IS

Nazim Madhavji MSc PhD(Manch)
 Professor (from September)
 Software quality, software engineering processes, tools and environments, process assessment and improvement, personal and team-level processes.

Canterbury

Dr Richard Pascoe
 Lecturer (from June)
 Geographical information systems.

Professor B Blum
 Fellowship (1 year)
 Software design.

Dr Matt Jones BSc(City) MPhil PhD(Camb) FRSA
 Lecturer
 Human-computer interaction, mobile computing, digital libraries.

Dr Margaret Jefferies BSc MSc PhD(Otago)
 Lecturer
 Artificial intelligence: robot navigation, spacial reasoning.

Dr Chris Knowles BSc(Hons)(Brunel) MSc(Kingston) PhD(London)
 Temporary Secondment
 Human-computer interaction, multimedia, online learning.

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Klause Mochalski
 Research Assistant
 Internet data analysis.

Auckland

Dr Andy Brooks
 Senior Lecturer (from October)
 Experimental computer science: evaluation of algorithms, tools, techniques, and human-computer interfaces.

Ms Myra Cohen
 Senior Tutor (from January)
 Combinatorial design, applied to RAID disks and software testing.

Dr Patrice Delmas
 Lecturer (from March)
 Computer vision: human facial expression analysis.

Dr Gill Dobbie
 Senior Lecturer (from February)
 Data repositories including databases, semi-structured data, and data warehouses.

Dr Jenny Shearer
 Honorary Research Fellow (from August)
 Internet ethics.

Mr Burkhard Wuensche
 Lecturer (from January)
 Computer graphics, scientific visualization, medical imaging, CAGD, simulation algorithms.

Dr Mark Wilson
 Lecturer, joint with Mathematics (from February)
 Combinatorics, theoretical computer science.

Promotions

Otago CS

Geoff Wyvill BA(Hons)(Oxon) MSc PhD(Brad) MACM FNZCS
 Congratulations to Geoff who was promoted to Professor in Computer Science at Otago. His interests include modelling, csg, antialiasing, ray tracing, surface design, and implicit methods.

Otago IS

George Benwell BSurv PhD(Melb) MPhil(City) MNZCS MISAust MNZIS
 Congratulations to George who was promoted to Professor in Information Science at Otago. George has interests in spatial information, particularly information systems development and analysis tools, the behavioural analysis of spatially referenced information systems and processes, and fuzzy rule extraction for spatial data.

Martin Purvis BS(Yale) MFA(Colum) MS PhD(Mass)
 Congratulations to Martin who was promoted to Associate Professor in Information Science at Otago.

Martin's research interests include distributed information systems and agent-based software engineering, computer supported cooperative work, process modelling and the modelling of dynamic information systems, spatial information systems modelling and analysis, alternative architectures for connectionist computation, models and applications of broadband networks.

Canterbury

Ray Hunt
 Congratulations to Ray Hunt who has been promoted to Associate Professor. Ray's interests are in the area of data communication.

Auckland

Dr Jacky Baltés
 Senior Lecturer, joint with Electrical and Electronic Engineering.

Ms Adriana Ferraro
 Senior Tutor (from August)

Dr John Grundy
 Congratulation to John Grundy who has been promoted to Associate Professor. John's interest areas are in software engineering environments and methodologies, software process technology, software architecture, component-based systems ("componentware"), visual programming and program visualisation, computer-supported cooperative work (CSCW), and object technology.

Dr Bakh Khoussainov
 Congratulation to Bakh Khoussainov who has been promoted to Associate Professor. Bakh's primary interests are in theories of computations, computable structures, abstract data types, randomness, automata and logic.

Mr Andrew MacGibbon
 Senior Tutor (from August)

Visitors

Otago CS

Associate Professor Lu Da (until April)
 Changshu College of Suzhou University, China
 Computer image processing, artificial intelligence and character automatic recognition.

Associate Professor Scott Leutenegger (until April)
 University of Denver, USA
 Performance modeling, multi-dimensional database indexing, mobile computing, scheduling, and parallel/distributed resource management.

Dr Michela Spagnuolo (March)
 Istituto per la Matematica Applicata Consiglio Nazionale delle Ricerche, Genova, Italy
 Shape-based approaches for modelling spatial data,

techniques of geometric reasoning for the extraction of shape features from discrete surface models, having spatial data handling as primary application context.

Professor Terry Caelli (April – May)
University of Alberta, Edmonton, Canada
Computer vision, pattern recognition and machine learning and applying these technologies to industrial, agricultural and environment problems.

Otago IS

Dr John Fryer (February)
University of Newcastle, Callaghan, NSW
Visiting Professor who gave a seminar on Aboriginal Rock Art, and a seminar of forensic photogrammetry.

Professor Martin Shepperd (March)
Bournemouth University, UK
JA Valentine Visiting Professor. Empirical software engineering, process modelling, software metrics.

Dr Jim Riddell (March – June)
Food and Agriculture Organisation, Rome
William Evans Visiting Fellow. Land registries, administration, systems and markets and spatial systems.

Dr C Giles (June – July)
NEC Research Institute, USA
Williams Evans Visiting Fellow. Working with Professor Nikola Kasabov.

Canterbury

Professor B Page (February – March)
Erskine Fellow. University of Hamburg, Germany
System simulation and environmental informatics.

Dr K Koedinger (February – March)
Erskine Fellow. Carnegie Mellon University
Intelligent tutoring systems.

Professor R Mathar (February – April)
Erskine Fellow. Aachen Uni of Technology, Germany
Mobile communication networks.

Professor M Ferguson (July – December)
Erskine Fellow. INRS Telecommunications,
University of Quebec
Intelligent tutoring systems.

Professor R Unland (November – March)
Computer Science, University of Essen, Germany
Database systems.

Professor Y Hayashi (April – January 2002)
Computer Science, Meiji University, Japan
Neuro computing and fuzzy systems.

Lincoln

Panama Geer (3 months)
PhD student, Mathematics Dept, Rensselaer Polytechnic Institute, New York

Waikato

Richard Bordman (December – March)
Imperial College, London
Work space organisation, usability studies, ethnography, mobile computing.

Auckland

Professor Larry Carter (December – March)
Honorary Research Fellow
Scientific computation, performance programming, parallel computation, machine and system architecture for high performance.

Professor Jeanne Ferrante (December – March)
Honorary Research Fellow
Compiling for high performance, automatic detection and exploitation of parallelism, optimizing data movement and resource usage.

Dr Jung-Joong Kim (from January '00)
Honorary Research Fellow
Application system development: information systems for Olympic Games.

Dr Yiwen Sang (1 year, from October)
Honorary Research Fellow
Computer networking.

Departmental News

Otago CS

Department Head: The founding Head of Department, Professor Brian Cox, retired at the end of December. A public 'Farewell' Lecture was held and also a dinner for the staff of the department. Our new Head of Department is Dr Ian McDonald.

Student Numbers: Numbers are approximately what they were last year, however our third year numbers are up and creating a strain on resources.

New Lab: Continuing the saga of the last couple of years where we have acquired a new building or part of a building each year, we have recently completed a new laboratory to cope with our second and third year students. It has been built to resemble a villa so that it matches the other houses in the street. This brings our total number of locations to eight!!

Marsden Funding: Geoff Wyvill was successful in obtaining further funding from the Marsden Fund.

Kaye Saunders

Canterbury

Resignations: Dr D Adjero has resigned to accept an assistant professorship in the USA. Dr BJ McKenzie has resigned to take a job in industry.

Enrolment: Our department now boasts the worst staff to student ratio in the University (together with

Psychology). Enrolments in Computer Science have increased again (about 12%). This has happened in all majoring courses. Counter to this trend numbers in our non-advancing course (COSC110) have been decreasing, while second and third year courses have an increase in enrolments of about 20%.

We are experimenting with joint courses with the Mathematics and Electrical Engineering departments.

Equipment: CISCO donated around \$30,000 worth of networking routing equipment for use in both senior undergraduate laboratories as well as for research with post graduate students. This equipment supplements the already generous donation of \$70,000 worth of firewall equipment from Watchguard Technologies in Seattle during 2000. The equipment is being primarily used by Associate Professor Ray Hunt in COSC331 and AFIS323 classes and for post graduate research.

Wolfgang Kreutzer

Lincoln

Visiting PhD student: Panama Geer, a PhD student in the Mathematics Department at Rensselaer Polytechnic Institute (RPI), New York, visited Lincoln for 3 months in 2000, to work with Keith Unsworth.

The research is concerned with the application of “swarm intelligence” to the construction of geometric shapes. As a starting point, the construction of discrete straight lines is being studied using an “ant algorithm”.

Ant algorithms have been applied to a number of optimisation problems such as the Travelling Salesperson Problem. The idea is that the behaviour of real ants is simulated by laying “virtual pheromone” on ant trails. This pheromone attracts other ants, and after a number of iterations convergence to an optimum route (in our case a straight line) is achieved.

The report on this work is about to appear as a Lincoln University research report.

Collaboration continues via email, and a return fixture is planned for the second half of 2001 with Keith visiting RPI.

Visit to Technical University Braunschweig: Professor Don Kulasiri (AMAC) has just returned from four weeks at the Technical University Braunschweig in Germany where he has been lecturing on stochastic dynamics and computation to masters students in the university’s Computational Sciences programme. He also presented a seminar on his research dealing with a new approach to contaminant transport modelling.

Beowulf Parallel Cluster: We have recently acquired a 9-processor Beowulf parallel cluster. Each processor is 800 MHz, with 128 Mb RAM, and all processors are connected by a private 100 Mb switched Ethernet network. The system is running Linux. This cluster is now situated in the Transpower lab of the Center for Advanced Computing Solutions, and will be used for research in such areas as modelling and simulation. We also invite expressions of interest from those who

would be interested in collaborating with us in making use of this cluster.

Elizabeth Post

Victoria

Formation of the Centre for Logic, Language and Computation: In February 2001 VUW Council approved the establishment of a Centre for Logic, Language and Computation (CLLC). CLLC is an interdisciplinary Centre which brings together staff and students from Mathematics, Computer Science, Philosophy and Linguistics. CLLC aims to promote research in logic, computation and the logical analysis of language (including related areas, such as formal syntax), particularly at the interface between these disciplines. Further details about CLLC and its activities are available from <http://www.clc.vuw.ac.nz>, or by contacting Neil Leslie (Neil.Leslie@vuw.ac.nz).

John Hine

Waikato

Deputy Chairperson: Associate Professor Steve Reeves has been appointed to the newly created position of Deputy Chairperson. Steve’s research interests are formal methods in software engineering and HCI, functional and logic programming, and mathematical foundations of computer science.

Enrolment: Undergraduate enrolments in 2000 were down slightly on previous years figures. However, we are back up to 1999 figures again with around 500 undergraduate EFTS for 2001.

Lab renovation: Computer Science research labs have had some major re-arrangements and renovations in the past year. We have seen the creation of four new labs: the Formal Methods lab, Usability lab, LIDS lab and a second Warp lab. With the advancement in research fields and research students other labs, such as the Digital Library lab and Machine Learning lab, have also been expanded.

Mark Apperley

Formal Methods lab: The Formal Methods lab at Waikato has recently gained two further externally-funded grants which, with the existing ISuRF grant, means that we now have three grants based in the lab.

The first of the new ones, the B/Z Testing Tools project, concerns collaboration with l’Université de Franche-Comté in France and is led by Mark Utting. The project is developing techniques and tools for the validation of Z and B specifications and the generation of test sets from specifications. It thus forms an important part in the industrial application of Formal Methods, which means it is carrying on in the spirit of the original ISuRF project.

The second new project, the Z project, also has a component of collaboration, this time with the University of Essex in the U.K. The project leader is Steve Reeves. The work of the project concerns looking at ways of

extending the specification language Z to include, in as elegant a way as possible, the notions of refinement and program derivation. The project is also looking at ways of extending the notions of derivation and refinement to μ -charts, a language first developed in Germany which we have substantially revised and extended. It is a mathematically elegant form of the popular Statecharts notation. This project, rather than being industrially-oriented, is far more in the spirit of fundamental research—we might expect the results of research such as this to emerge onto the industrial scene in around ten years time.

There have also been some personnel changes in the lab. Greg Reeve, who was formerly a research assistant on the ISuRF project, is now a full-time PhD student funded by a grant from the Z project. Grant Anderson has joined the lab as a research assistant on the Z project. Both Greg and Grant are working under the supervision of Steve Reeves. Shaochun Wang is also a new arrival in the lab. He is a full-time PhD student working under the supervision of Mark Utting.

Steve Reeves

Auckland

New programmes: A draft specification for a Bioinformatics programme has been developed as a joint initiative between Biological Sciences, Medical and Health Science, Computer Science, and Statistics. This is an exciting new initiative that we hope to commence in 2002 following CUAP approval. As a fore-runner to this, a summer school paper BIOSCI 742 “Bioinformatics and Computational Biology” is being introduced in 2001, with teaching contributed by this Department.

Also under development, in collaboration with Philosophy and Linguistics, is a new programme in Logic and Computation. This programme, if approved, will be offered as a major in both the BA and BSc degrees, commencing in 2002.

Department space: While space has been a major issue for many years, including in 2000, we are delighted that the University now appears willing to address this issue in a substantial way. Late in 2000, approval was given to proceed to a design report stage for a new building to house our City Campus operations, and as an interim measure, space for the Department has been allocated in leased facilities nearby. These measures together go a long way to solving the continuing resourcing problems the Department has faced over the last decade.

Clark Thomborson

Obituary: Bruce Robson, Lincoln

Our colleague Bruce Robson died suddenly on 25th October, 2000. Bruce joined the staff at Lincoln as a statistician in 1982 but his background in IT meant that

he also made a significant contribution in that area. With Neil Mountier, the then Director of the Centre for Computing and Biometrics, Bruce developed the proposals for Lincoln’s first computing qualification, the Applied Computing Stream within the Bachelor of Agricultural Commerce Degree. This has since developed and evolved into the Bachelor of Applied Computing we have today.

Bruce taught into that programme, but as he completed his PhD on the Modelling of Magnesium Metabolism in Ruminants he rekindled his interest in mathematics. He was instrumental in setting up a first year calculus paper and introduced Maple into the teaching programme. Further maths papers followed with the emphasis on modelling, particularly of natural systems. The ideas were good, but unfortunately these subjects didn’t receive the student support they deserved.

Bruce believed passionately in the traditional role of the university and didn’t hesitate to speak out fearlessly on these matters. His belief in the importance of science, mathematics and just thinking were always evident. This led to his involvement in organisations such as The Science Technology Roadshow, Science Alive, Royal Society and the Centre for Health Care Technology NZ.

Bruce loved a debate, even if it was about something he was supposed to have done and hadn’t! His absence is strongly felt.

Elizabeth Post, Lincoln

ACM International Collegiate Programming Contest

On the 10th of March 64 competed in the 2001 World Finals of the ACM International Collegiate Programming Contest, held in Vancouver, Canada. A team from Otago University (Ben Handley, Andres James and Michael Bevin) assisted by coach Chris Handley attended as representatives of New Zealand and the South Pacific region. Unfortunately they did not come in the top three, but had an enjoyable time taking part.

We believe that the World Finals may be held in New Zealand within the next three years, so get your students interested in taking part. Helpers will no doubt be required to help with this, so keep it in mind. Also, if you have a large venue (like an indoor stadium that’s the size of 10 tennis courts for example) in your area that could be used, get in touch with Chris Handley at chandley@otago.ac.nz He’s thinking about logistics already!!

Kaye Saunders, Otago CS

“News from New Zealand”

In the last years I was running the column “News from NZ” for the Bulletin of the European Association for

Theoretical Computer Science (three issues per year) with news from Theoretical Computer Science, in the broadest sense, its relations to Mathematics and Applied Computer Science, in a variety of subjects, from research to teaching, from conferences and workshops to new appointed people. The Bulletin of the EATCS is distributed to more than 2000 members, universities and companies, and is a good vehicle to make NZ results/ideas/people/programmes/departments known to the world; it also contains “News” columns from Australia, South America, India, Japan, Ireland.

In the past you have contributed to the “News” column in a way or other. My aim is two fold: a) to consult you on ways to make this column more NZ-oriented, not only/mainly Auckland, b) to invite you to send me any “news” from your specific areas (which I will include in my next column). You may send me any “news” at any time, not necessarily packed or prior to the deadline for each issue.

Cristian Calude

Events

ANNES'2001—Artificial Neural Networks and Expert Systems

Dunedin (Otago IS) 22–24 November '01

Annes'2001 is pleased to announce exciting events in the areas of Intelligent Systems and Neurocomputing. This conference is associated with ICONIP'2001, ANZIIS'2001 and SEARCC'2001 and supported by APNNA (Asia Pacific Neural Network Assembly) and IFIP (International Federation for Information Processing).

There are three major themes; Adaptive Learning, Knowledge Discovery and Data Mining and Intelligent Systems for Communication.

Further information may be obtained from <http://divcom.otago.ac.nz/infosci/kel/conferences/annes2001/annes2001.htm> or by contacting Professor N Kasabov, Information Science Dept, University of Otago.

IVCNZ—The Image and Vision Computing New Zealand

Dunedin (Otago CS) 26–28 November '01

A call for participation will be published shortly. For more information, contact Kevin Novins (novins@cs.otago.ac.nz) or Brendan McCane (mccane@cs.otago.ac.nz).

NZCSRSC'01—New Zealand Postgraduate Student Conference

Christchurch (Canterbury) 19–20 April '01

The University of Canterbury Student Chapter of the ACM is organising NZCSRSC-01 sponsored by Accenture, Allied Telesyn and BCL.

The invited speakers for the conference are Professor Peter Eades from the University of Sydney and Professor Ian Witten from the University of Waikato.

More details at <http://www.cosc.canterbury.ac.nz/ACMchapter/NZCSPG/>

SIRC'01—13th Annual Colloquium of the Spatial Information Research Centre

Dunedin (Otago IS) 2–5 December '01

This annual conference will include a workshop on public health and GIS and demonstrations of current GIS technologies. International keynote speakers include Dr David Pullar from the University of Queensland and Dr David Hilbert from CSIRO.

Further information may be obtained from <http://divcom.otago.ac.nz/sirc/default.htm> or by contacting Dr PA Whigham, Information Science Dept, University of Otago.

The 5th Japan-Australasia Joint Workshop on Intelligent and Evolutionary Systems

Dunedin (Otago IS) 20–22 November '01

The theme for this joint workshop is “From Population Genetics to Evolving Intelligent Systems”. Intelligent and adaptive systems using evolutionary computation techniques have attracted increasing attention in recent years. They are more robust than traditional systems based on formal logic for many real world problems, and can adapt to an unknown environment without an explicit model. Evolutionary systems have now also been applied to a wide range of practical problems.

This workshop aims to bring together researchers from Australia, Japan and New Zealand in the fields of intelligent systems and evolutionary computation to exchange their ideas, present recent results and discuss possible collaborations.

Further information may be obtained by contacting Dr PA Whigham, Information Science Dept, University of Otago. pwhigham@infoscience.otago.ac.nz

Masters Theses

Otago CS

2000

David Parry—*Medical expert systems*

2001

Vegard Bakke—*Robotic control system*

Otago IS

2000

Tim Fletcher—*Factors that influence development effort in multi media*

Mona Abdulla—*An evaluation of view integration methodologies*

Greg Byrom—*Comparison of two approaches for minimising the inappropriate use of spatial data*

Byung-Hyun Yu—*Design and implementation of a native Java interface for ATM network applications*

2001

Simon Clark—QTVR support for teaching operative procedures in dentistry

Canterbury

2000

Lachlan Keown—Virtual worlds for software visualisation

Waikato

2000

Hong Chen—A new architecture for digital libraries

Greg Day—Clinical-view versus ELM: an investigation into image types in the context of skin lesion screening

Prasanthi Maramreddy—An exploratory study into bilingual interface preferences

John Newman—A template based abstraction for code synthesis in Sather

Auckland

2000

Andre Cesta—From dynamic languages to dynamic architectures

Terry Hui-Ye Chiu—Testing computational complementarity for finite automata using distributed object technology

Kai Hung Chow—A case-based cardiology learning system on the Web

Zili Deng—Applied tree automata for bounded treewidth graphs

Matthew Goode—Reinforcement learning in non-trivial dynamic environments

Fang Guo—Branch-and-bound algorithms for the broadcast problem

Nicholas Hildreth—Adaptive path planning for real-time systems

Arno Holosi—Alternative representations and beyond

See Mu Kim—Data prefetching with dual processors

Eric Leung—A comparison of communication technologies

Hao Li—Probabilistic regularisation of the dynamic programming stereo

Peiming Liang—Randomness and cellular automata

Yuming Lin—Path tracking control of non-holonomic car-like robot with reinforcement learning

Wai Kwan David Luk—Study of burrows - wheeler transform

David Maplesden—Tool support for design patterns

Ching Kwan Ng—Regularity preserving metrics

Robin Otte—Physically based modelling and animation of rigid body systems

Yong Joo Park—Learning and comparison of pursuit and evasion strategies in finite space

Rakesh Patel—Extending the UML with aspects

Zhou Peng—Graph embeddings and drawings of graphs of bounded treewidth

Costa Ristic—Performance issues in large databases

Michael Sanders—Evolving locomotion controllers for virtual creatures

Po Shao—3D reconstruction of piscine vision

Qiaosheng Shi—Post-processing techniques for stereo terrain reconstruction

Hao Jie Sun—Surface area measurement based on polygonalization

Ching Yi Tsai—A comparative study of two astronomical software packages

Yuan-Sheng Tsai—Dynamic photometric stereo

Haobi Wang—A Web-based workflow management system for a rental car company

Shyh-Chyu Wang—Rendering human hair

Liming Wu—Integration of 3S PSM and shape from boundary

Liu Xiong—Vertex cover obstructions and a minor containment algorithm

Fan Xu—Checkpointing in internet-based distributed computing systems

Yu Pan Ben Yip—Border measurement analysis for planar objects

Yuanhua Yu—Measuring data cache and tlb parameters under Linux

Qi Zang—Counting people

Qinghui Zeng—Randomness as an invariant for number representations

Jianquan Zhang—Image matching for uncalibrated multiply-view scene reconstruction

Jian Zhong—Matching multiple-view images by the least square correlation techniques

PhD Theses

Otago CS

2000

Stephen Mills—Motion segmentation in long image sequences

Otago IS

1999

Jaesoo Kim—Neuro-fuzzy methods for building adaptive intelligent systems

Philip Jones—The applications of space-filling curves to multi-dimensional data

Canterbury

2000

Malathy Naguleswaran—Aggregation and other patterns of graph space

Mohammad Rezvan—*A distributed cache architecture for quality-of-service routing in communication networks*

Victoria

2000

Lindsay Groves—*Evolutionary software development in the refinement calculus*

Neil Leslie—*Continuations and Martin-Löf's type theory (Massey-Albany)*

Roger White—*Supervised learning of hierarchical clusterings with ART-based neural networks*

Waikato

2000

Dale Carnegie—*Speech analysis and synthesis using an auditory model*

Richard Littin—*The design and evaluation of an optimistic CPU - the WarpEngine*

Anthony Smith—*N-gram models of agreement in language*

Yong Wang—*Continuous multivariate prediction in empirical learning*