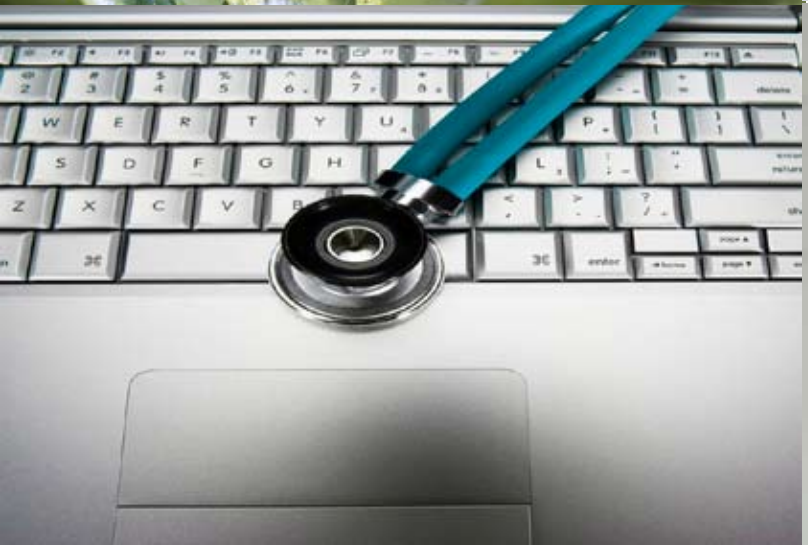
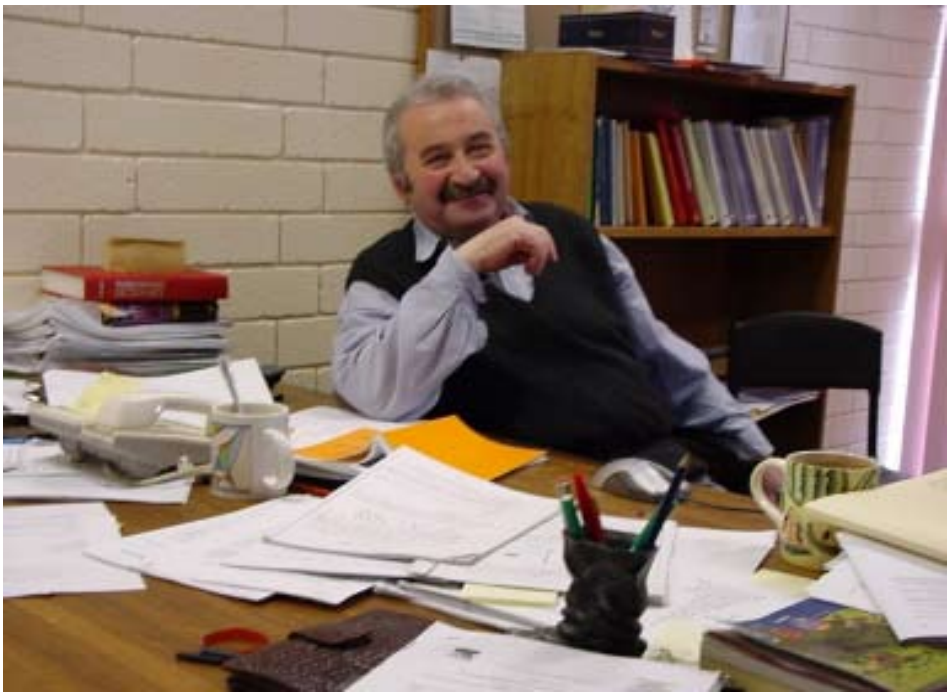
CIAO Newsletter

Centre for Informatics & Applied Optimization

School of Information Technology & Mathematical Sciences, University of Ballarat



Edition #22 - Summer 2008



Rubinov Memorial Lecture 2008

The Inaugural Alexander Rubinov Memorial Lecture took place at 5.30pm on Monday 10 November 2008 in Ballarat.

This new Public Lecture was presented by Professor Barney Glover, a former UB colleague, on the topic "Finding the best solution: Innovation, Education and Mathematics".

Professor Rubinov (pictured above) was the Founding Director of CIAO, and this event has been established to honour his memory and promote the mathematics and optimization work of CIAO.

Professor Glover (pictured below) is currently Deputy Vice-Chancellor, Research at the University of Newcastle, in New South Wales. He will take up a new appointment as Vice Chancellor at Charles Darwin University in the Northern Territory in April 2009.

Next year's Lecture will take place on Monday 9 November 2009.

New ITMS Graduate School

On 1 January 2009, the School of ITMS will become the Graduate School of ITMS. UB will invest $3 million over the next five years to guarantee its success.

This investment will fund a large number of well paid scholarships for students from around the world, to come to Ballarat to undertake advanced research in mathematical sciences and information technology.

At a time when computing and mathematics departments in universities across Australia are shrinking, this Graduate School is an unexpected and exciting development.

The University of Ballarat is already one of the biggest players in the International student market. It is renowned for producing industry-ready graduates and well known for its strong collaboration with IBM.

The Graduate School builds on the existing strengths ITMS has in teaching and research, by expanding collaboration with universities around the world.

CIAO Director:
Professor John Yearwood

IBM $10m Expansion

The University of Ballarat and IBM have recently announced a $10 million expansion of IBM's activities at UB's Technology Park, next to our Mt Helen Campus.

This exciting step will create approximately 130 new local jobs, and provide further opportunities for UB and ITMS graduates right here in Ballarat.

New Diabetes Research Program

CIAO is delighted to have recently signed an agreement with regionally-based Charles Sturt University, to work together on diabetes research.

Dr Herbert Jelinek, Senior Lecturer in Biomedical Science at CSU, has been instrumental in bringing this project together, and visited CIAO mid-year.

CIAO researchers will develop computer infrastructure, algorithms and software for data mining research, which will utilise datasets drawn from the Diabetes Screening Complications Initiative (DIScRi) , provided by CSU.

Dr Peter Vamplew

Staff Member Profile

Dr Peter Vamplew joined the University of Ballarat in December 2005, as a Senior Lecturer in the School of ITMS and a CIAO Researcher.

He is the Leader of CIAO's Data Mining and Informatics Research Group (DMIRG), supervises five research students, and currently teaches in the areas of multimedia communication, multimedia design & 2D animation, computer graphics & animation programming, and computer games engines.

Dr Vamplew graduated from Flinders University, South Australia in 1990, attaining a B.A. and B.Sc.(Hons) in Computer Science. In 1996 he completed his PhD at the University of Tasmania, where his thesis topic was the automated recognition of sign language using neural networks.

From 1991-2005 he was a Lecturer at the University of Tasmania, where he taught within the computing discipline, and while there also gained significant experience in unit development and Honours co-ordination.

Dr Vamplew's research interests lie in the areas of artificial intelligence, particularly reinforcement learning, neural networks and evolutionary computation.

Artificial intelligence is a technological capability, where functions are performed that we usually associate with human intelligence, including reasoning and the ability to maximise positive or desired results through repeated experiences.

Artificial intelligence is best described as the branch of computer science which attempts to approximate the results of human reasoning.

It does this by organising and manipulating facts and knowledge gained through the process of problem solving.

Reinforcement learning is a type of machine learning, and therefore a branch of artificial intelligence.

It allows machines and software agents to automatically determine the ideal behaviour within a specific context, in order to maximise its performance. Simple reward feedback is required for the agent to learn its behaviour, and this is known as the reinforcement signal.

Reinforcement learning allows the machine or software agent to learn its behaviour, based on feedback from the environment. This behaviour can be learnt once and be retained, or can keep adapting through further exposure.

If a problem is modelled carefully and with sophistication, some reinforcement learning algorithms can end up achieving a global optimum. This result can be described as the ideal behaviour with maximum reward.

There are many applications for reinforcement learning, because problems often have a generic similarity.

Many problems in artificial intelligence can be mapped to a decision process, and the advantage here is that the same theory can then be applied to many different problems.

A **neural network** is a system of programs and data structures which mimic and approximate the operation of the human brain.

A neural network usually involves a large number of processors operating together simultaneously, with each processor having its small sphere of knowledge and access to data in its local memory.

In most cases, a neural network is initially "trained" or fed large amounts of data and rules about data relationships .

A program can then instruct the network how to behave in response to an external stimuli, or can initiate activity on its own.

Evolutionary computation is another computer based problem solving system, which uses computational models of evolutionary processes in its design and implementation.

Dr Vamplew's research has so far produced seven journal papers, 35 Australian and international conference papers, and two book contributions.

Visitor from Turkey:

Mr Hakan Tor

PhD student **Mr Hakan Tor** is currently visiting CIAO from the Middle East Technical University (METU) in Turkey, & will be here until the end of April 2009.

He is here to complete the writing up of his PhD thesis - titled "Large scale non-smooth optimization", with particular emphasis on discrete gradient methods - under the direction of his CIAO co-supervisor, **Dr Adil Bagoriv** and his METU co-supervisor, Professor Bulet Karasozen.

In his spare time Mr Tor is also a Research Assistant in the Department of Mathematics at METU, where he plans to continue his academic career as a researcher and mathematics lecturer.

Mr Tor's fiance is also currently visiting Australia, continuing her education and architectural studies at Sydney University.

Below (L to R): Mr Hakan Tor and Dr Adil Bagirov

Research Group News

MAORG: Mathematical Analysis & Optimization

Leader: Dr Adil Bagirov

MAORG continues a high level of activity, with weekly meetings & seminars taking place on Wednesdays from 4.00-5.00pm. These events provide an opportunity for research staff and students to learn about the work being undertaken by their colleagues, and develop and pursue collaborative opportunities.

The project "Pipeline Optimization" with Grampians Wimmera Mallee Water is progressing well. The optimization software for minimizing pumping costs will be demonstrated to GWM Water management in December 2008.

Dr David Yost travelled overseas during September 2008, and attended:

> the Fifth International Workshop on Functional Analysis, University of Trier, Germany, 8-13 September 2008.

> the Third Meeting on Vector Measures, Integration and Applications, Katholische Universität Eichstätt-Ingolstadt, Germany, 23-27 September 2008.

Dr Yost also visited the following universities for collaborative work:

~ University of Karlsruhe, Germany: Dr Diethard Pallaschke and Dr Zhiyou Wu.

~ University of Salzburg, Austria: Dr Reinhard Wolf.

~ University of Zielona Gora, Poland: Dr Krzysztof Przeslawski.

Mr Peter Martin will present an Invited Lecture in a Research in Vocational Education and Training session, at the International Conference on Teaching Statistics (ICOTS 8), Slovenia, July 2010.

DMIRG: Data Mining and Informatics

Leader: Dr Peter Vamplew (below)
Deputy Leader: Dr Richard Dazeley

DMIRG meets regularly, providing an opportunity for research staff and students to get together, share research developments and new ideas, and generally learn from each other.

Recent meetings have featured:

> A presentation by guest speaker **Mr Greg Simmons**, an ITMS lecturer and current PhD student.

Mr Simmons presented on using genetic algorithms for the annual Australian Rules Football League draw.

The AFL football competition involves 16 teams competing over 22 weeks, from March to September, with the requirement that each team must play each other at least once.

> A presentation by **Dr Adil Bagirov**, Senior Research Fellow in CIAO and MAORG Leader.

Dr Bagirov presented on "Modified global k-means algorithm for minimum sum-of-squares clustering problems".

> A presentation by **Dr Julien Ugon**, Research Fellow in CIAO and MAORG Member.

Dr Ugon presented on "Nonsmooth optimization approach to the incremental construction of piecewise linear boundaries between sets".

International Collaboration

University of Limoges, Limoges, France

CIAO and the University of Ballarat have recently signed a Bilateral Agreement with the University of Limoges, to establish preferential links in the field of scientific research and teaching, and the initiation and development of collaborative research projects with CIAO.

Systems Research Institute,
Polish Academy of Sciences

CIAO and the University of Ballarat have recently entered into a Memorandum of Understanding with the Systems Research Institute in Poland, to develop a co-operative strategic relationship.

Broad objectives are to collaborate on research projects related to optimization theory and variational analysis.

Both of these alliances were negotiated by **Dr Alex Kruger** during his recent overseas trip.

GCAP 2008

Gaming Technology students from the School of ITMS recently finished in the top three in a major award category, during the recent Game Connect - Asia Pacific Conference 2008 in Brisbane.

GCAP 2008 attracts representatives from the Asia Pacific region's game development industry, to focus on industry improvement, investment, advancement and growth.

Four ITMS students - calling themselves Team C - were listed as finalists in the Independent Games Award (Indie section) for their game, Battle Scarred.

The students are currently undertaking a Batchelor of Information Technology (Computer Games), and were supervised and mentored by CIAO researcher and ITMS lecturer **Mr Grant Meredith**.

Team C recently completed a twelve month project for Infinite Interactive, a Melbourne based games company, and is now looking at commercial opportunities for Battle Scarred.

GAME CONNECT 08 ASIA PACIFIC

Research Laboratory News

ICSL: Internet Commerce Security

Director: A/Professor Paul Watters

ICSL Director - **Dr Paul Watters** recently visited the United Kingdom to build awareness of ICSL's activities and develop collaborative research links.

The main institutions and organisations visited were:

> Professors Chris Mitchell and Peter Wild, Security Research Group, Royal Holloway, University of London (RHUL).

> Colin Whittaker and Richard Martin, APACS (UK Payments Association), representing 31 UK banks.

> William Rothwell, Abatis-HDF.

> Allan Sudlow and Lee-Ann Coleman, British Library.

> Oliver Hill and Lucio Cicolecchia , Apto Consulting & Dspace @ Cambridge.

There are excellent opportunities for collaboration with these groups and organisations. In particular, RHUL are keen to host researchers and students in the security area for extended visits.

Research Student News:

PhD student **Mr Dean Webb** was guest presenter at a recent ICSL Meeting at UB, on the topic "Using fake links and email content to profile Phishing groups".

PhD student **Ms Amber Stabek** recently attended the Advance Fee Fraud Symposium organized by Queensland Police.

Masters student **Mr Glenn Stevens** recently attended the Global Botnet Taskforce Workshop in Washington DC, United States of America.

HIL: Health Informatics

Leader: Dr Andrew Stranieri

HIL and CCeH are currently undergoing a restructure, to refine the way both entities research, interact and work together.

An important element will be the retention of the Australian Health Messaging Laboratory (AHML), currently housed within CCeH.

National Institute of Health Informatics

HIL has been working collaboratively with Professor Malcolm Pollock and Dr Jim Warren from the University of Auckland, by contributing its expertise to a report.

The report is titled "Strategic Directions for Health Informatics Content Interoperability in New Zealand - HISAC", for the National Institute of Health Informatics.

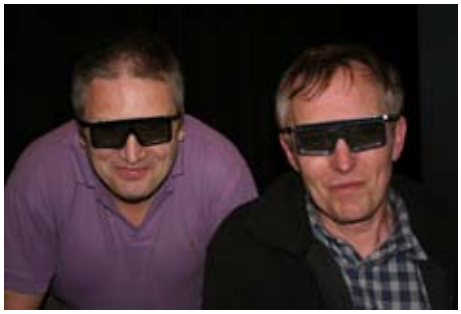
Department of Human Services Tender

CCeH has recently been successful in its tender to provide the Department of Human Services with specifications for their online forms.

The work is valued at $43,000, is already well under way, and will be completed by early 2009.

VRSL: Virtual Reality and Simulation

Leader: Dr David Stratton (below R)
Dep Leader: Dr Phil Smith (below L)



Discussions with ARUP

VRSL recently hosted a visit from ARUP, a leading international engineering company. Its Planning Department engineers are looking for collaborators in their 3-dimensional modelling of pedestrian movement within architectural designs.

Of particular interest to ARUP was the modelling of sound in this context, which led to a follow up visit to the ARUP Sound Laboratory in Melbourne.

AEES: Australian Earthquake Engineering Society Conference

Dr David Stratton presented a poster relating to the development of a dense seismic sensor network, at this recent Ballarat conference.

collaborative centre for eHealth

HL7 Board Appointment

Congratulations to CCeH's **Ms Jane Gilbert** who was recently elected to the board of Health Level 7 Australia.

This board oversees the setting of the HL7 health messaging standard in Australia, liaising with government, universities, software vendors and HL7 international.

This is a notable appointment and illustrates the regard that community has for Jane personally, and for the excellent work that our AHML (Australian Health Messaging Laboratory) does.

Jane was also recently elected co-chair of the HL7 International Implementation and Conformance Technical Committee.

Grant Applications Submitted

Australian Research Council Linkage Grant: Round 2 - 2008

Topic: Integrating dynamic and optimization models for efficient pipeline system operations in an evolving water and energy market.

Chief Investigators: Dr Adil Bagirov and Professor John Yearwood

External CI: Professor William Moran, University of Melbourne

Principal Investigator and Industry Partner: Dr Andrew Barton, Grampians Wimmera Mallee Water

ARC Funding Sought: $258,132

Victorian Cancer Agency Research Grant

Project Leader: Dr Andrew Stranieri

Topic: The development and evaluation of a knowledge-based computerised system for the assessment of supportive care needs in cancer patients

Partners: Dr Tony Love, School of BSSH, UB and Dr Stephen Vaughan, Grampians Integrated Cancer Services

Deakin University & University of Ballarat Collaboration Fund: Application #1

Project Leader: Assoc Professor Paul Watters

Topic: Novel Multiple Classification and Clustering Algorithms for Anti-Phishing

UB Project Personnel: A/Prof Paul Watters, Professor John Yearwood & Dr Xinwen Wu

Deakin Project Personnel: Professor Matthew Warren, Dr Jemal Abawajy & Dr Lei Pan

Deakin University & University of Ballarat Collaboration Fund: Application #2

Project Leader: Dr Andrew Stranirei

Topic: A Framework for Community Reasoning and Decision-Making on Water

UB Project Personnel: Dr Andrew Stranieri, Professor John Yearwood & Dr Pam McRae-Williams

Deakin Project Personnel: Dr Michelle Graymore

Grants Awarded

Helen Macpherson Smith Trust Grant

Topic: A Framework for Community Reasoning and Decision-Making on Water

UB Project Personnel: Dr Andrew Stranieri, Professor John Yearwood, & Pam McRae-Williams, WIDCORP - Water in Drylands Collaborative Program

External Partner: Dr Gavin Thoms, Melbourne Systems Laboratory

Funding Awarded: $50,000

Description: this one-year pilot project will develop and refine a prototype of model-based reasoning and decision frameworks, engaging and guiding communities towards transparent decisions on water.

A significant Australian Research Council Linkage Grant application will also be developed by the completion of the project.

CIAO Seeding Grants:

#1 Topic: "Decomposition methods for unit commitment problems in electricity power industry"

Researcher: Dr Fusheng Bai

Funding: $5800, for two Research Assistants

#2 Topic: "Improving general aviation pilot competencies in gaining a private pilot licence using personal computer flight simulation software"

Researcher: Mr William Harvey

Funding: $5404, for flight simulation software and equipment

#3 Topic: "Topic: Analysis test bed for botnet, root kit and other malware binaries"

Researcher: Mr Glenn Stevens

Funding: $3852, for a cluster of nine low power nodes

#4 Topic: "Exploring how Alzheimers sufferers engage with interactive 3D environments"

Researchers: Ms Alyx Macfadyen & Dr Andrew Stranieri

Funding: $4845, for a Research Assistant

#5 Topic: "Efficient tracing systems for identifying illegitimate redistributors"

Researcher: Dr Xinwen Wu

Funding: $3700, for Research Assistant

Conferences & Seminars

ISSNIP 2008

Dr Sidhi Kulkarni is a co-organiser of the Symposium on Machine Learning and Applications at ISSNIP 2008, the Fourth International Conference on Intelligent Sensors, Sensor Networks & Information Processing, 15-18 December 2008, Sydney.

Colloquia at UB

Recent colloquia presentations have been made by the following visitors to CIAO:

> ***Professor Jerzey Filar***, Centre for Industrial & Applied Mathematics, University of South Australia, Adelaide

Topic: Hamiltonian Cycles, Markov Chains and Non-Convex Optimization

> ***Associate Professor Paul Watters***, Director, Internet Commerce Security Laboratory, University of Ballarat

Topic: British Government Data Losses - Practical Lessons in Data Security

Seminars at UB

Recent seminars have been presented by:

> ***Dr Bob Anderssen***, Commonwealth Scientific & Industrial Research Organisation, CSIRO, Mathematical and Information Sciences, Canberra, ACT

Topic: Plant Breeding, Polymer Dynamics and Complete Monotonicity

> ***Ms Senga Munro***, Scottish Storytelling Centre, Edinburgh, Scotland, United Kingdom

Topic: The Importance of Storytelling

Staff News

ICT Ballarat & UB Council

Congratulations to Dr Charlynn Miller, who was recently appointed as a member of ICT Ballarat and an academic staff representative on the University of Ballarat Council.

Resignation

CIAO Business Development Manager Mr Con Nikakis has resigned from his position to pursue other opportunities in Melbourne. We would like to wish him the very best for the future.

Wedding Celebration

Congratulations and best wishes to Mr Grant Meredith, on his recent marriage to his fiance Jane.

Baby Boom Continues

Congratulations to Dr Nadezja Sukhorukova and Dr Julien Ugon, who recently welcomed a second son - baby Leo, Ballarat's youngest mathematician - to their family.

Research Student Profile:
Mr Adam Hassell

Mr Adam Hassell is a local Ballarat resident, who commenced his PhD research with ITMS in February 2006.

He was previously a systems engineering and computer science double degree undergraduate at RMIT.

Mr Hassell's thesis topic is "A videogame based framework for remote asset tasking", and he is supervised by Dr Phil Smith (Principal) and Dr David Stratton (Associate).

This research thesis investigates and develops a framework for assessing the potential benefits of using video game based interfaces - languages and codes - for remote vehicle tasking.

Unmanned vehicles (UVs) are being increasingly employed in civil and military domains, in often dangerous environments. Current examples include the ongoing conflict in Afghanistan and Iraq.

Typically these vehicles require some level of human supervision, and therefore require a user interface to enable tasking and feedback. Most existing interfaces are specific to the UV and may require significant user training.

One potential solution is to exploit proven video game interfaces to improve UV control, however to date there has been a lack of organised means by which these approaches can be evaluated.

The framework developed as part of Mr Hassell's research addresses this issue, allowing game based interfaces to be compared with current approaches to interface design.

Mr Hassell is nearing the completion of his research, and is currently writing up his thesis for examination.

UB Research Conference: 5 November 2008

Congratulations to the following ITMS Research Students, who picked up the following awards at this event:

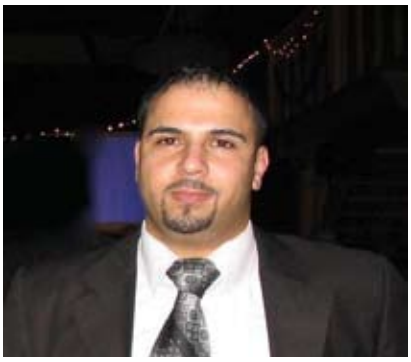
~ **Ms Armita Zarnegar**: Award and $500 prize for Most Outstanding Full Conference Paper, titled "Inference of Gene Expression Networks Using a Gene Expression Programming".

~ **Ms Sandra Herbert**: Award and $150 book voucher for Best Oral Presentation, titled "Phenomenographic study of conceptions of rate".

~ **Mr Alex Kuznetsov**: Award and $50 book voucher for Best Oral Presentation, titled "Simulation and optimization of the vehicle suspension parameters".

~ **Mr William Harvey**: Award and $50 book voucher for Best Oral Presentation, titled "Improving general aviation pilot competencies in gaining a private pilot licence using personal computer flight simulation software".

New Research Student



We are pleased to welcome **Mr Mamoun Alazab** (pictured above) to CIAO and the School of ITMS.

He recently commenced a PhD titled "Improving Web Services Security Architecture", under the supervision of Associate Professor Paul Watters (Principal) and Dr Sita Venkatraman (Associate).

Visiting Research Student

Ms Zhenhua He visited CIAO from Chongqing Normal University in China, from 9 Sep to 5 Nov 2008. Ms He is a Masters by Research Student, and was here to work on numerical optimization with Dr Fusheng Bai.

Visitors to CIAO

CIAO recently hosted visits from the following personnel:

Professor Jean-Pierre Crouzeix

Professor Crouzeix works at the Laboratoire Informatique et Modélisation des Systèmes, Université Blaise Pascal, Clermont-Ferrand, France.

He is a well known expert in nonsmooth analysis, was close friend of the late Professor Alexander Rubinov, and visited CIAO to collaborate with Dr Adil Bagirov.

Associate Professor Yongjian Yang

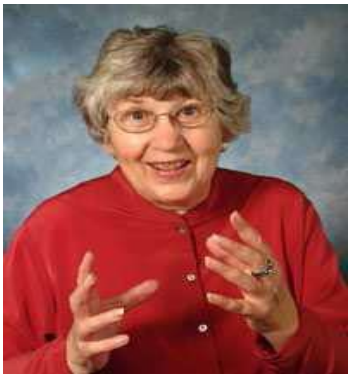
Associate Professor Yang works at Shanghai University in China, and visited CIAO in August-September 2008 to collaborate with Dr Musa Mammadov.

Ms Senga Munro

Ms Munro (pictured below) is a Scottish storyteller and retired teacher, who visited CIAO as a guest of Dr Andrew Stranieri.

Having listened to her grandmother's tales as a child "straight frae the mooth", Senga continues the family tradition of storytelling, by sharing Scottish and Hungarian folk tales, reworked ballads, environmental stories and family life.

She was a co-presenter at NILE 2008, the biennial conference titled "Narrative in Interactive Learning Environments", held in Edinburgh, Scotland. Her work has synergies with the narrative research undertaken by Dr Stranieri and Professor John Yearwood.



Publications

Book Chapters: Published

Islam, M., Yearwood, J. & Vamplew, P. (2008) Unsupervised Color Textured Image Segmentation Using Cluster Ensembles & MRF Model, Advances in Computer & Information Sciences & Engineering, Springer (published online).

Journal Papers: Submitted/Accepted

Berry, A. & **Vamplew, P.** (2008) Exploring the Utility and Practicality of Unbounded Archives for Evolutionary Biobjective Optimization, IEEE Transactions on Evolutionary Computation (submitted).

Dazeley, R., Kelarev, A., Yearwood, J. & Mammadov, M. (2008) Optimization of Multiple Classifiers in Data Mining Based on String Rewriting Systems, Asian-European Journal of Mathematics (accepted, to appear).

Kelarev, A., Yearwood, J. & Vamplew, P. (2008) A Polynomial Ring Construction For Classification of Data, Bulletin of the Australian Mathematical Society (accepted).

Kelarev, A., Ryan, J. & Yearwood, J. (2008) An Algorithm for the Optimization of Multiple Classifiers in Data Mining Based on Graphs, JCMCC Journal of Combinatorial Mathematics and Combinatorial Computing (accepted).

Lee, M., **Miller, C. & Newnham, L.** (2008) Podcasting and University Students: Why don't they subscribe?, The Internet and Higher Education (accepted, in press).

Lee, M., **Miller, C. & Newnham, L.** (2008) RSS and content syndication in higher education: subscribing to a new model of teaching and learning, Educational Media International, (accepted, in press).

Ollington, R., **Vamplew, P.** & Swanson, J. (2008) Incorporating Expert Advice into Reinforcement Learning Using Constructive Neural Networks, Constructive Neural Networks (submitted).

Pan, H., Haidar, I. & Kulkarni, S. (2008) Daily Prediction of Short-Term Trends of Crude Oil Prices using Neural Networks Exploiting Multimarket Dynamics, Frontiers of Computer Science (submitted).

Sukhorukova, N., Ugon, J. & Yearwood, J. (2008) Workload coverage through nonsmooth optimization, Optimization Methods and Software (accepted).

Watters, P. (2008) University Incorporated, Implications for Professional Information Security Education, Corporate Govern-ance (accepted).

Journal Papers: Published

Baca, M., **Dafik, Miller, M. & Ryan, J.** (2008) Edge-antimagic total labeling of disjoint union of caterpillars, Journal of Combinatorial Mathematics and Combinatorial Computing, Vol.65, pp.61-70.

Balbuena, C., Lin, Y. & **Miller, M.** (2008) Diameter-sufficient conditions for a graph to be super-restricted connected, Discrete Applied Mathematics, Vol.156, Issue 15, August 2008, pp.2827-2834.

Dafik, Miller, M., Ryan, J. & Baca, M. (2008) On antimagic labelings of disjoint union of complete s-partite graphs, Journal of Combinatorial Mathematics & Combinatorial Computing, Vol.65, pp.41-50.

Herbert, S. & Pierce, R. (2008) An 'emergent model' for rate of change, International Journal of Computers for Mathematical Learning (publ. online).

Marshall, K. & Ryan, J. (2008) On antimode graphs, Journal of Combinatorial Mathematics and Combinatorial Computing, Vol.65, pp.51-60.

Sugeng, K. & **Miller, M.** (2008) New constructions of A-magic graphs using labeling matrices, Journal of Combinatorial Mathematics and Combinatorial Computing, Vol.65, pp.147-152.

Sukhorukova, N. (2008) A generalization of the Remez algorithm to a class of linear spline approximation problems with constraints on spline parameters, Optimization Methods and Software, Vol.23, No.5, October 2008, pp.793-810.

Venkatraman, S. & Delpachitra, I. (2008) Biometrics in Banking - A Case Study, Information Management & Computer Security, Vol.16, No.4, pp.415-530.

Venkatraman, S. & Hughes, S. (2009)The development of an information systems strategic plan: an e-government perspective, International Journal of Business Excellence, Vol.2, No.1, pp.50-64.

Conference Papers:

Bagirov, A., Ugon, J., Barton, A.F. & Briggs, S. (2008) Optimization of operations of a water distribution system for reduced power usage, 9th National Conference on Hydraulics in Water Engineering, Darwin, Northern Territory, 23-26 Sep 2008.

Dzalilov, Z. & Ouveysi, I. (2008) Challenging issues in dynamic reconfiguration of telecommunication networks, Proceedings of Second International Conference on Problems of Cybernetics and Informatics, Baku, Azerbaijan, 10-12 Sep 2008.

Haidar, I., Kulkarni, S. & Pan, H. (2008) Forecasting Model for Crude Oil Prices Based on Artificial Neural Networks, ISSNIP 2008, Fourth International Conference on Intelligent Sensors, Sensor Networks and Information Processing, 15-18 Dec 2008, Sydney, NSW (accepted).

Islam, M. (2008) Unsupervised Segmentation of Industrial Images, CISSE 2008, International Joint Conferences on Computer, Information and Systems Sciences and Engineering (virtual forum), 5-13 December 2008 (accepted).

Islam, M. (2008) MRF based unsupervised colour textured image segmentation, CISSE 2008, International Joint Conferences on Computer, Information and Systems Sciences and Engineering (virtual forum), 5-13 Dec 2008 (accepted).

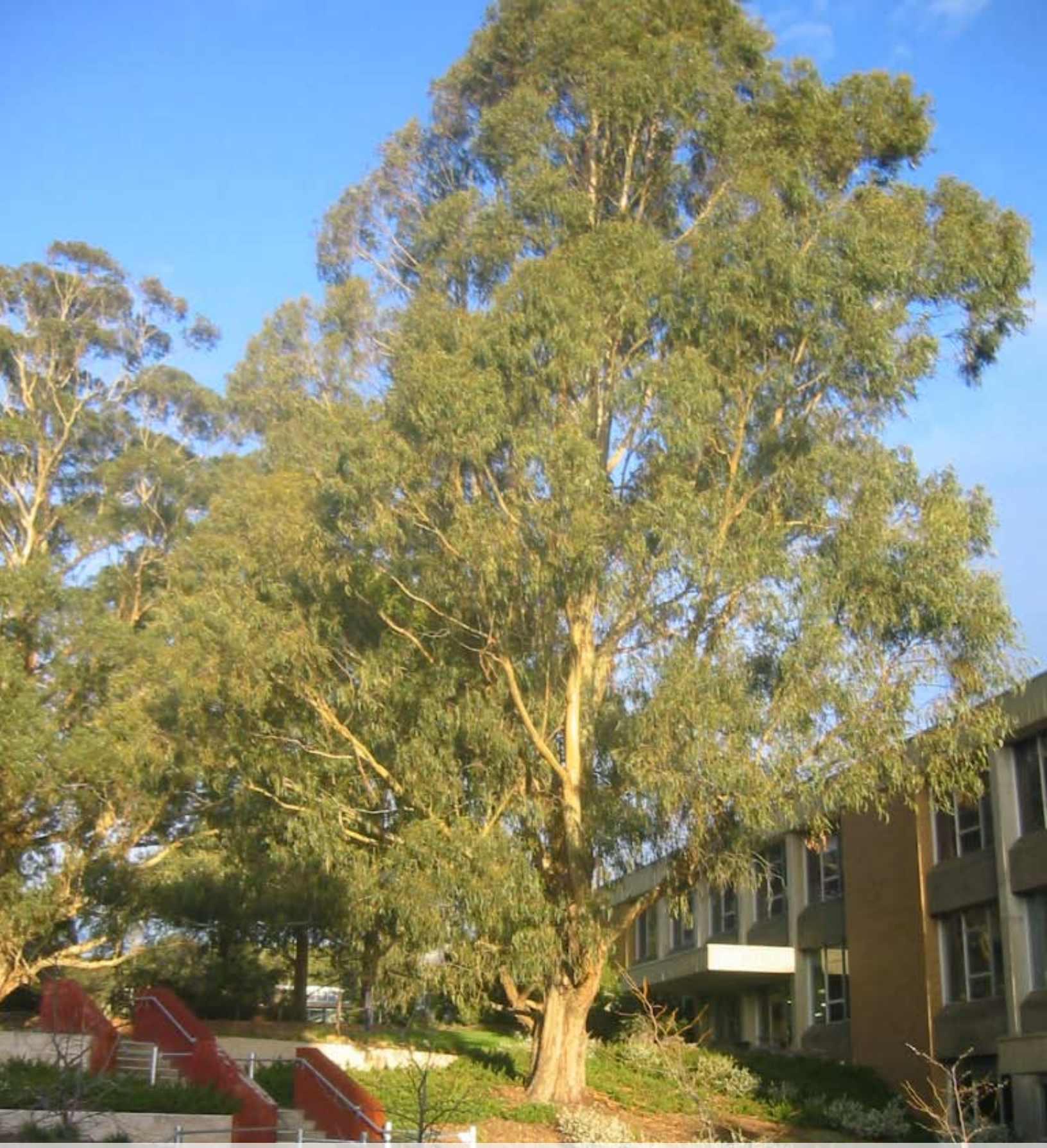
Keogh, K. & Venables, A. (2008) The importance of 'industrial strength' project management documentation for final year computing students, WACE/ Australian Collaborative Education Network Asia Pacific Conference 2008, 30 Sep to 3 Oct 2008, Sydney (accepted).

Venkatraman, S. (2009) An Adaptive Framework for Biometric Systems, Proceedings of International Conference on Computer Engineering & Technology, ICCET 2008, 22-24 Jan 2008, Singapore (accepted).

Venkatraman, S. (2009) Autonomic Context-Dependent Architecture for Malware Detection, International Conference on e-Technology, e-Tech 2009, 8-10 Jan 2009, Singapore (accepted).

Wu, X., Watters, P. & Yearwood, J. (2008) New Traceability Codes and Identification Algorithms for Tracing Pirates, 2008 IEEE International Workshop on Cyberspace Safety and Security, Sydney (accepted).

Yearwood, J., Kang, B H & **Kelarev, A.** (2008) Experimental investigation of classification algorithm for ITS dataset, Pacific Rim Knowledge Acquisition Workshop, PKAW 2008, at Tenth Pacific Rim International Conf on Artificial Intelligence, PRICAI 2008, Hanoi, Vietnam.



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Photograph: one of the many large gum trees on Mt Helen Campus, University of Ballarat