



CIAO NEWSLETTER

Centre for Informatics & Applied Optimization

School of Information Technology & Mathematical Sciences

Edition Number 20 – Winter 2008 ❄

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From the Editors

Welcome to the Winter Edition of the CIAO Newsletter.



News

Official Opening:

Internet Commerce Security Laboratory (ICSL)



Pictured above (L to R):
ICSL Director – Associate Professor Paul Watters
CIAO Director – Professor John Yearwood

CIAO's new Internet Commerce Security Laboratory was formally opened on 14 May 2008 at the University of Ballarat, in front of an excited audience of more than 100 people.

The Honourable Theo Theophanous, State Government Minister for Information and Communication Technology officiated at this important event.

The ICSL is a collaborative project funded by Westpac Banking Corporation, IBM Global Technology Services, the Victorian State Government, and the University of Ballarat, and is a unique venture that is the first of its kind in Australia.

Speakers at the opening included:

- Professor David Battersby, Vice-Chancellor, University of Ballarat (UB)
- Mr David Backley, Chief Technology Officer, Westpac Banking Corporation
- Mr Peter Campbell, General Manager, IBM Global Technology Services

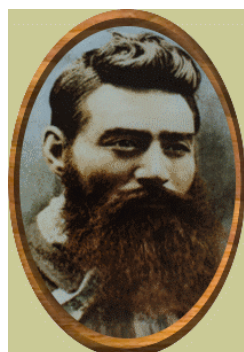
The ICSL will produce an ongoing capability to tackle the national and international problems associated with internet fraud, internet security and identity management.

It will also provide highly skilled, industry-ready Information and Communication Technology (ICT) postgraduate researchers, prepared for employment within the banking and financial services sector.

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Westpac's Mr Backley reminisced that his bank's first significant theft by an individual occurred when outlaw Ned Kelly robbed a Westpac bank (then known as the Bank of New South Wales) in 1879 and stole £2141.



Mr Backley pointed out that similarly today, it is individuals who are increasingly becoming a threat to bank security and internet commerce security in general through highly sophisticated and ever evolving fraud and identity theft. However unlike Ned Kelly (pictured above), people now don't even have to be in the same country to commit these crimes.

CIAO Director, Professor John Yearwood, was the UB key negotiator and team leader in developing and bringing this project to fruition, and was ably assisted by Mr Mal Vallance, Director of Business Development at UB, who became involved when Mr Robert Hooke officially retired in 2006.

Key personnel from ICSSL's partnership were Mr Richard Johnson, Head of Technical Security, Westpac; Mr Simon Brown, Information Security Consultant, Westpac; Mr Cameron Woolfe, IBM; Mr Anthony O'Shea, Multimedia Victoria; and Mr Rob Jones, Regional Development Victoria.

This project broadens CIAO's important relationship with IBM, creates a strong bond with Westpac and the Victorian State Government, and is expected to grow significantly over the next five years to include other key stakeholders.



Pictured above (L to R): Mr Dean Webb and Mr Desmond Lobo, two PhD students working and researching at the ICSSL

Profile: Dr Richard Dazeley

Dr Richard Dazeley (pictured right) joined UB in June 2007, as a games lecturer and researcher.

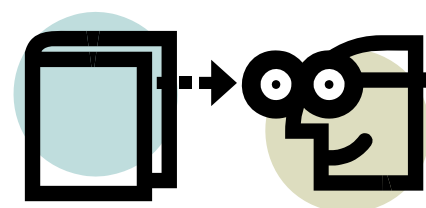


He previously worked at the University of Tasmania, where he completed his PhD in prudence analysis.

Dr Dazeley is broadly interested in knowledge based systems (KBS), and specifically interested in approaching KBS at their core, by examining their philosophical base. This is a cognitive science approach, which poses the question: what is knowledge?

Dr Dazeley's PhD thesis led him to develop an approach for applying prudence analysis to knowledge based systems, where very little research has previously been undertaken.

Knowledge based systems manage large volumes of knowledge about particular subjects, however it is impossible for their knowledge to be complete. So at some point, when the KBS can't answer a posed question, it will attempt to answer it from available known knowledge, providing a less than complete or appropriate answer.



Conversely, when prudence analysis is applied to a knowledge based system, there is an in-built capacity for the KBS to "know itself", and know if it doesn't know enough to answer a question. This can be described as having a meta understanding of itself.

When a human knowledge engineer extracts knowledge, codifies the knowledge, then puts it into a computer, the knowledge is at best approximately 99% right and 99% complete.

However when this knowledge is then accessed – for example, by nursing staff in a hospital – there is the expectation that the knowledge being accessed is 100% right.



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If prudence analysis had been applied to the knowledge management system in this hospital environment, then nursing staff would sometimes receive answers from the KBS that are clearly identified as incomplete or unknown, and therefore more accurate or more truthful for the nursing staff.



Dr Dazeley's research for his thesis involved developing a method to find hidden context, using prudence analysis as the application area to apply this new method.

Hidden context involves identifying contexts that are unknown even to the expert. They are similar to a form of tacit knowledge, effectively trying to find and identify tacit context.

To date, there have only been three other attempts to develop KBS systems using prudence analysis:

- the first included a relatively unsuccessful attempt, and adopted a premise that examined the knowledge and attributes being used in the knowledge based system;
- the second much more successful study was by Paul Compton at the University of New South Wales, which was a refined version of the first attempt;
- the third was part of an incomplete Masters thesis, approximately ten years ago.

Dr Dazeley's PhD results were favourably comparable to Compton's results, however included installing a variable within the system which could be adjusted to produce more or less warnings, and was able to be tailored to whatever specific environment was desired, whether highly sophisticated and sensitive or more basic and rudimentary.

He found that the more complex the data set, the better his new method would work. His new method was tested on a news gathering service example, by scanning news articles around the world, classifying them, providing people with relevant news articles, and included a sophisticated warning system on possible articles of interest to the recipient.

Dr Dazeley's approach was very different to these first three attempts, and involved the use of multiple classification ripple down rules (MCRDR), an approach which comes up with multiple conclusions and was first published by Dr Byeong Ho Kang in his 1996 PhD thesis. Byeong subsequently became Dr Dazeley's PhD supervisor.



Dr Dazeley's system takes the multiple conclusions MCRDR comes up with, and the inferencing path taken through the rules, then applies pattern matching techniques (neural networks), and looks for patterns in the inferencing paths. If it comes across a new pattern, it produces a warning saying "not sure about this conclusion".

Dr Dazeley also retains an ongoing interest in reinforcement learning, and is currently undertaking research in this area with Dr Peter Vamplew, as well as MCRDR research with Dr Andrew Stranieri.

His approach assumes that patterns that have occurred before are correct, and when patterns appear that haven't occurred before, it produces a warning. This form of anomaly detection is identical to prudence analysis, and Dr Dazeley used Compton's old work as a comparison.

He is also interested in improving the standard of artificial intelligence in games, and is currently developing software that will increase the sophistication and assist the development of artificial intelligence in games.



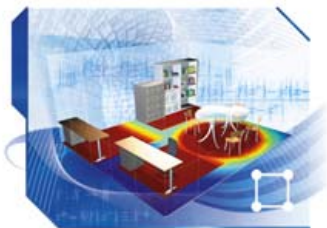
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News from:

CIAO Research Groups

Mathematical Analysis & Optimization Research Group (MAORG)



Dr Adil Bagirov: Group Leader

Water Optimization Project: Grampians Wimmera Mallee Water (GWM Water)

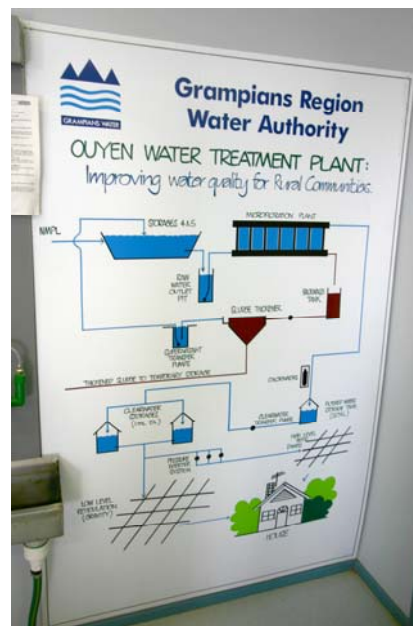
This project with GWM Water involves the design of a water distribution model within the Grampians Wimmera Mallee catchment area, which will optimize water usage for all stakeholders. Stakeholders include land owners, farmers, city and rural town residents, industry, and local and state governments.

In May 2008 Dr Julien Ugon and Mr Con Nikakis travelled to Ouyen as part of Phase 1 of the project, to inspect GWM Water's facilities there, to acquire knowledge about its operations and to scope the project.



CIAO is now working with National ICT Australia's (NICTA) Dynamic Model to develop a mathematical optimization model, which interfaces with the Dynamic Model representation of the Ouyen section of the pipeline system, in north western Victoria.

Factors that will be considered in developing the optimized model are power usage (peak versus off peak), variations in demand, capacity of intermediate reservoir storage, number of pumps, pumping pressure, pipe diameter, water treatment capacity and location of treatment, and the seasonal variance.



CIAO personnel involved:

- Prof John Yearwood
- Dr Adil Bagirov
- Dr Julien Ugon
- Mr Con Nikakis

Partner personnel involved:

- Dr Andrew Barton, GWM Water
- Dr Pam McRae-Williams, Water in Drylands Collaborative Research Program, WIDCORP
- Mr Gavin Thoms, NICTA



Cancer Research

Dr Zari Dzalilov and Dr Musa Mammadov recently attended a meeting with the Victoria Cancer Control Research Institute, to discuss research collaboration.

They are currently preparing a proposal for a joint research project titled "Investigating Successes and Failures of Tobacco Control Instruments".

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Kann Finch Project : Update

This ARC Linkage Project with industry partner Kann Finch deals with the efficient designing/planning of office space.

The main problem is to determine/evaluate the efficiency of the floor space for a given occupant, and involves the study of the optimal planning/placement of workpoints.

The first stage – development of the mathematical modelling – is now complete.

Software has been developed to visualise office design and the solutions that have been arrived at using a local optimization procedure.



So far about eight workshops have been held with key project participants from Kann Finch and the Australian Mathematical Sciences Institute (AMSI), in Ballarat and also at AMSI's offices in Melbourne.

Work is currently being undertaken on fast and efficient global optimization algorithms, which will be used in the software that is being developed.

The initial results of the project were presented at the International Conference on Optimization : Techniques and Applications, ICOTA 2007, in Kobe, Japan, in a paper titled "An optimization approach to evaluate the efficiency of office space based on utility functions".

The project is proceeding well, and is on track to complete on time.

Chief Investigator: Dr Musa Mammadov
Partner Investigators: Mr Paul Bondin, Kann Finch
Dr Tom Montague, AMSI
Dr Phil Broadbridge, AMSI
Research Associates: Dr Fusheng Bai
Dr Eldar Hajilarov
Dr Jason Giri

Early Career Researcher Program

Congratulations to MAORG Member Dr Nadezda Sukhorukova (pictured below), who has recently been accepted into the ECRP at the University of Ballarat.

This six-month program is specifically designed for researchers who have recently obtained their PhD, and provides weekly tailored workshops on all aspects of research within academia.



Study Leave

MAORG Member Dr Alex Kruger has been granted study leave for the second half of 2008, and plans to travel overseas during this time to work collaboratively with:

- Professor Jiri Outrata, Institute of Information Theory and Automation, Academy of Sciences, Prague, Czech Republic.
- Professor Bernd Kummer, Humboldt University, Berlin, Germany.
- Professor Ewa Bednarczuk, Systems Research Institute, Polish Academy of Sciences, Warsaw.

Data Mining & Informatics Research Group (DMIRG)



Dr Peter Vamplew: Group Leader



Get Into Games Expo : May 2008

DMIRG members played a key role at the recent "Get Into Games" Expo held at the Ballarat Mining Exchange on 16-17 May 2008, and hosted by the City of Ballarat.

This Expo presented an opportunity to interact directly with students from regional Victorian high schools and colleges, who were bussed in from places like Horsham, Dimboola, Colac, Bendigo and Geelong.

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These students participated in presentations which provided information about the undergraduate and postgraduate games options available at UB, and enjoyed the opportunity to road test new technology and interact with representatives from the games industry.

Teachers from these schools also attended the Expo and received information about what UB has to offer, to assist them in providing career guidance to current and future students.

Several undergraduate students displayed their project prototypes at the Expo, and participated in presentations to potential students.



This is a valuable annual showcase for UB students, as last year's Expo provided a number of graduates with industry contacts which led to them being offered full-time employment.

CIAO participants at the Expo included:

- ✓ Dr Peter Vamplew
- ✓ Dr Richard Dazeley
- ✓ Mr William Harvey
- ✓ Mr Grant Meredith

Early Career Researcher Program

Congratulations to DMIRG Deputy Leader Dr Richard Dazeley, who has recently been accepted into the ECRP at the University of Ballarat.

Monthly DMIRG Meetings

DMIRG Leader Dr Peter Vamplew has initiated monthly group meetings and seminars, as well as individual meetings with DMIRG members.

GAPBusters

DMIRG is developing a relationship with GAPBusters, which will look at undertaking text mining of mystery shopper surveys.

Internet Commerce Security Laboratory (ICSL)



Associate Professor Paul Watters: Laboratory Leader

ICSL Official Opening

The official opening of the ICSL took place on 14 May 2008 – see page 1 for more information.

Other events held that day at UB were:

- ⇒ The inaugural meeting of the Executive Board of the ICSL.
- ⇒ The Victorian Government's eSecurity cluster (SECIA), eSecurity Innovation and Awareness, ran a security workshop featuring speakers from eB2BCom, Assurance and IBM Global Services.

New PhD Student

We are pleased to have made a PhD offer recently to Mr Mamoun Al Azab, who will work in the Web Services security field.

Research Plans

ICSL members are currently developing research plans to meet research goals in the following areas:

- Forensic imaging
- Malware profiling
- Fraud detection systems
- Public key infrastructure (PKI) improvement
- Identity theft
- Recovery services and end user communication and awareness



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Virtual Reality & Simulation Laboratory (VRSL)



Dr David Stratton: Laboratory Leader



Research Projects

The VRSL is currently examining ways to engage the virtual reality facility in ongoing research with other CIAO research groups. In particular, the potential to apply 3D visualization to issues within optimization is being examined.

Follow-on work from the Australian Defence Force anthropometry project is also being investigated, both with defence in the same general human modelling area, and also applying distributed simulation techniques to integration of human models into extended simulations.

Health Informatics Laboratory (HIL)



Dr Andrew Stranieri & Mr Chris Lynton-Moll: Laboratory Leaders

Early Career Researcher Program

Congratulations to HIL Member Dr Ahmed Bani-Mustafa (pictured below), who has recently been accepted into the ECRP at the University of Ballarat.



Current Projects

The following projects are currently being developed by HIL members:

1. Complementary Alternative Medicine Projects
 - Expert system for Traditional Chinese Medicine diagnosis of arthritis
 - Establishment of an Intelligent Adverse Complementary Medicine
 - On line reaction form for reporting of adverse reactions
 - Homeopathy data analysis
2. Health Education Projects
 - Narrative Interactive Learning Environment for intensive care nurses
 - Art for Health
3. Support systems in Health
 - Prescription Management System
 - JustEthics Ethics application decision support
4. Evidence based Medicine
 - Evidence based Hip Replacement
5. Health Mining
 - Sleep Apnea Mining
 - Adverse Drug Reaction Mining

eHealth Cluster

HIL members have recently participated in meetings with Ballarat industry groups involved with eHealth, with the view to forming collaborative projects and applying for a Multimedia Victoria Grant.



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Collaborative Centre for eHealth



CCeH Manager
(pictured right):
Mr Chris Lynton-Moll



Commercial Projects

Mr Con Nikakis
Business Development
Manager (pictured right)



Current Projects

- ⇒ Queensland Health Electronic Ongoing Needs Identification (eONI).
- ⇒ Investigations into and development of an intelligent decision support system for general practitioners in home based sleep disorder diagnosis.
- ⇒ Structured Reports for Radiology Reporting: delivering a series of structured radiology reports to be incorporated into radiology information systems, to facilitate structured reports.
- ⇒ Two-year contract to deliver Health Level 7 (HL7) Education and Training packages for HL7 Australia. Training courses scheduled to take place in Perth during June 2008.
- ⇒ A two day seminar was held recently on implementing HL7 messaging standards, an update on the new NPAAC guidelines for Pathology, use of CDA for discharge referrals, and working with GP desktop systems to implement standards.
- ⇒ Service Co-ordination Tools Template 2008 update for the Department of Human Services, Victoria.
- ⇒ Victorian Statewide Referral Form HL7 message specification and Australian Healthcare Messaging Laboratory (AHML) implementation.



Ballarat Innovation Festival: May 2008

CIAO participated in this two-week festival by attending various events and showcasing our commercial and research capability.

Key events included:

- “Dinnervation”: a dinner hosted by HG Nelson and featuring futurist Dr Peter Ellyard and former Victorian Premier Mr Steve Bracks.
- University of Ballarat Innovation Expo: an afternoon showcase at the Greenhill Enterprise Centre.
- Ballarat “Get Into Games” Expo: a two-day information expo held at the Ballarat Mining Exchange.



Universities Innovation Showcase : 22 May 2008

CIAO participated in this event in Melbourne, which was subtitled “Delivering Business Solutions”.

Presentations included a seminar session co-presented by one of CIAO’s industry partners, Mr Paul Bondin, Director of the Kann Finch Group, which examined case studies involving the Australian Research Council Linkage Grant Program.



Australian Government
Australian Research Council

Grants

Early Career Researcher Grants

Several ITMS staff members participated in UB's Early Career Researcher Program during the second half of 2007.

They subsequently successfully applied for the following Early Career Researcher Grants:

- ✓ **Dr Long Jia**
Amount: \$10,510
Topic: The development of an intelligent learning environment for Traditional Chinese Medicine practitioners and students
- ✓ **Dr Xinwen Wu**
Amount: \$10,000
Topic: Innovative Traceability Schemes for Protecting Digital Intellectual Property
- ✓ **Dr Fusheng Bai**
Amount: \$8,400
Topic: Developing new decomposition methods in separable large-scale optimization



Pictured above (L to R):
Dr Long Jia, Dr Fusheng Bai, Dr Xinwen Wu

Grant Applications: Submitted

Telstra Foundation

The Internet Commerce Security Laboratory recently submitted an application to the Telstra Foundation, for a research grant in the area of cyber safety.

CIAO Personnel: A/Professor Paul Watters, Professor John Yearwood, Dr Xinwen Wu, Dr Liping Ma



Conferences & Seminars

Conference Attendance & Presentations

La Trobe University – Bendigo

Dr David Yost presented an invited talk on "Indecomposable polyhedra" at the Bendigo campus of La Trobe University, on 29 February 2008.

Mathematical Evolutionary Biology Workshop

Dr Zari Dzalilov attended this workshop at Naracoorte Caves, South Australia, from 25-30 March 2008 and presented a talk.

Second International Conference on Nonlinear Programming with Applications 2008, NPA 2008

Dr Adil Bagirov was an Invited Speaker at this conference which was held in Beijing, China, from 7-9 April 2008 and hosted by the Academy of Mathematics and Systems Science, Chinese Academy of Sciences (AMSS).

Dr Bagirov's paper and presentation was titled "Approximate methods in nonsmooth optimization".

48th Workshop: Nonsmooth Analysis, Optimization & Applications

Dr Adil Bagirov attended this workshop on 9-17 May 2008 in Erice, Italy, and presented a paper titled "Quasidifferentiable Optimization: Methods and Applications".

International Workshop on Organised Adaptation in Multi-Agent Systems, AAMAS 2008

Ms Kathleen Keogh attended this workshop on 12-16 May 2008 in Estoril, Portugal and presented a paper titled "Coordination in Adaptive Organisations: Extending Shared Plans with Knowledge Cultivation".



EURO Mini Conference: Continuous Optimization and Knowledge Based Technology 2008

Dr Adil Bagirov, Dr Musa Mammadov, Dr Fusheng Bai and Mr Dean attended this conference on 20-24 May 2008 in Neringa, Lithuania.

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Papers presented included:

- An auxiliary function method for constrained systems of nonlinear equations, Dr Fusheng Bai.
- An optimization approach to evaluate the efficiency of different office spaces, Dr Musa Mammadov.
- A comparative study of different clustering analysis algorithms, Mr Dean Webb.

AACMAC 2008: Australasian Acupuncture & Chinese Medicine Annual Conference

Dr Andrew Stranieri and Dr Long Jia attended this conference on 23-25 May 2008 in Sydney, New South Wales, and presented a paper titled "Development of Interactive Learning Environments for Traditional Chinese Medicine".



Second International Conference on Control and Optimization with Industrial Applications, COIA 2008

Professor John Yearwood, Dr Adil Bagirov, Dr Musa Mammadov and Dr Zari Dzailov attended this conference on 2-5 June 2008 in Baku, Azerbaijan.



Pictured right:
Azerbaijan conference venue the Mardakan Arboretum, established in the 14th century

Papers presented included:

- Approximate methods in nonsmooth optimization, Dr Adil Bagirov.
- Experimental investigation of classification algorithms for ITS dataset, Professor John Yearwood.

31st Annual Conference of the Mathematics Education Research Group of Australasia, MERGA 2008

Ms Sandra Herbert attended this conference on 28 June to 1 July 2008 at the University of Queensland, Brisbane, and presented a paper titled "Reflections on Exponential Functions".



Second International Workshop on Web Mining for E-Commerce and E-Services, WMEE 2008

Ms Deanna Osman attended this conference on 29 June 2008 at Rydges Hotel in Melbourne, and presented a paper titled "System fusion to improve opinion detection in weblogs for market research", co-written with Dr Peter Vamplew and Professor John Yearwood.

This paper has also been recommended for inclusion in expanded form in a follow up journal issue.



Australian Statistics Conference 2008

Dr Chris Turville attended this conference on 30 June to 3 July 2008 at the Sofitel Hotel in Melbourne.

Fifth World Congress of Nonlinear Analysts, WCNA 2008

Dr Alex Kruger will attend this conference on 2-9 July 2008, in Orlando, Florida, USA, and present a paper titled "About Extremality, Stationarity and Regularity of Collections of Sets".



Sixth Australian Conference on Teaching Statistics, OSCOT 2008

Mr Peter Martin will attend this conference on 3-4 July 2008 in Melbourne, and present a paper titled "Assessing Participants in Industrial Training Process".

18th Triennial Conference of the International Federation of Operational Research Societies, IFORS 2008

Dr Alex Kruger will attend this conference on 13-18 July 2008, in Sandton, South Africa.

6th Australian Homeopathic Medicine Conference 2008

Mr Chris Turville will attend this conference on 12-14 September 2008 at Bondi, New South Wales, and present a paper titled "Empirical Research in Homeopathy – Collection and Use of Raw Data".

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Dynamical Systems: Stability, Control, Optimization

Dr Alex Kruger will attend this conference on 29 September to 4 October 2008 in Minsk, Belarus.

International Symposium on Variational Analysis and Optimization

Dr Alex Kruger will attend this conference on 28-30 November 2008 in Kaohsiung, Taiwan.

ITMS Colloquia & Seminars

ITMS Colloquia Series 2008

Colloquia Co-ordinator:
Ms Maxine Kingston
(pictured right)



Recent presentations in the Colloquia Series were:

- *Analysing confidential data without compromising confidentiality:*
Dr Christine O'Keefe, Research & Business Leader, Health Data & Information, CSIRO Mathematical & Information Sciences and Preventative Health National Research Flagship

ITMS Seminar Series 2008

Recent presentations in the Seminar Series were:

- *Virtual pilots in virtual planes:*
Dr David Stratton, Leader of Virtual Reality & Simulation Laboratory and Senior Lecturer, School of ITMS

Visitors to CIAO

Recent visitors include:

- ✓ Dr Herbert Jelinek
Senior Lecturer, Biomedical Science
Research Fellow, Centre for Research in Complex Systems (CRiCS), Charles Sturt University
- ✓ Dr Christine O'Keefe
Research & Business Leader –
Health Data & Information,
CSIRO Mathematical & Information Sciences and
Preventative Health National Research Flagship

Profile: Mr Bahadorreza Ofoghi

Mr Bahadorreza Ofoghi (pictured below) arrived in Australia in March 2005, to undertake his PhD at the University of Ballarat.

His chosen PhD Topic is "Natural language factoid question answering in shallow semantically parsed texts", and he is supervised by Professor John Yearwood (Principal) and Dr Liping Ma (Associate).



Mr Ofoghi is undertaking research into a new model to elevate the performance of Automated Question Answering Systems using encapsulated semantics in lexical resources, mainly FrameNet.

FrameNet is a project located at Berkley University in the USA, which is creating an on-line lexical resource for English, based on frame semantics and supported by corpus evidence.

The aim of Mr Ofoghi's research is to investigate and contribute to two parts of fact-seeking Question-Answer (QA) systems: the information retrieval and answer processing modules, by considering semantic information from FrameNet.

The novel feature of this study is its coverage of different aspects using frame-based semantic information from factual QA systems.

In this complementary approach, the model exploits several components from computational linguistics, the WordNet concept hierarchy to cope with such situations, as well as Named Entity recognition and Question Type analysis.

The hybridization of these two approaches in a sequential manner, as well as the infrastructure and design features of each approach in the model, is the main contribution of this work.

Mr Ofoghi is close to completing his research and submitting his PhD thesis for examination.



Staff News

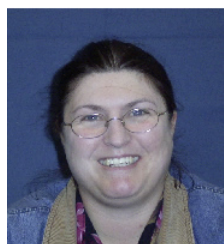
Australia's Biggest Morning Tea

Our staff participated in this fundraising event for the Australian Cancer Council on 22 May 2008. We raised just under \$100, and will work to make it even more successful next year.

Special thanks to Ms Nadine Gass for organising the event, and to everyone who donated food and/or came along to support the event.



Farewell to Staff



We bid farewell to Mrs Sally Firmin (pictured left), who is leaving ITMS to take up a technology teaching position in Ballarat.

This will also provide more opportunity to advance her PhD studies, while caring for her young family.

Post-Graduate News

Pictured right:
Dr Phil Smith,
Higher Degrees
Research Co-ordinator



Graduations

Congratulations to the following ITMS research students, who graduated on 5 May 2008:

- ☞ Mr David Andrews: PhD
- ☞ Mr Gary Saunders: PhD
- ☞ Ms Chandima Tilakaratne: PhD
- ☞ Mr Darren Lierkamp: Master of Computing

Confirmation of Candidature

Congratulations to the following students, who recently participated in the Confirmation of Candidature process, and as a result successfully gained full PhD candidature:

Student:	Mr Dean Webb (pictured below)
Degree:	PhD
Topic:	Optimisation based algorithms for large scale data mining problems
Principal Supervisor:	Dr Adil Bagirov
Assoc Supervisor:	Dr Musa Mammadov



New Student Representative

Our congratulations go to Ms Armita Zarnegar (pictured below), for taking on the role of Research Student Representative for the School of ITMS.

Armita is currently researching her PhD on the topic "Identifying Improved Gene Signature by Integrating Biological Knowledge and Hybrid Evolutionary Techniques in Microarray Data".



She will be the research student representative until May 2008.

Canada Trip

PhD Student Mr Asef Nazari Gangelou travelled to Canada on 9-20 June 2008, to participate in the 12th Pacific Institute for Mathematical Sciences (PIMS) Industrial Problem Solving Workshop, and the 11th PIMS Graduate Industrial Mathematics Modelling Camp.

This trip was predominantly funded by his Australian Mathematical Sciences Institute award, which was reported in the last CIAO newsletter.



Publications

Journal Papers : Submitted / Accepted

Bagirov, A. (2008) Modified global k-means algorithm for sum-of-squares clustering problems, *Pattern Recognition* (accepted).

Dazeley, R. & Kang, B. (2008) Discovering Hidden Contexts in Symbolic Knowledge, *Knowledge and Information Systems Journal*, Springer (submitted).

Kelarev, A.V., Yearwood, J. & Mammadov, M. (2008) A formula for multiple classifiers in data mining based on Brandt semigroups, *Semigroup Forum* (accepted).

Sukhorukova, N. & Ugon, U. (2008) Conditions of stationarity for best linear spline approximation with free knots, *Foundations of Computational Mathematics* (submitted).

Sukhorukova, N. (2008) A generalisation of the Remez algorithm to a class of linear spline approximation problems with constraints on spline parameters, *Optimization Methods and Software* (accepted).

Journal Papers : Published

Lee, M.J.W., Pradhan, S. & Dalgarno, B. (2008) Using screencasting to scaffold exercises and promote cognitive engagement for novice object-oriented programmers, *Journal of Information Technology Education*, Volume 7, pp.61-80.



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Mr Sunam Pradhan

Manyem, P. (2008) Syntactic Characterizations of Polynomial Time Optimization Classes, *Chicago Journal of Theoretical Computer Science*, Vol.2008, Article 3.

Miller, C. & Gleeson, L. (2007) Metropolitan university campuses: Serving the needs of adult students?, *Journal of Continuing Higher Education*, Vol. 55, No. 3, pp.2-13.

Yost, D. (2008) A different Johnson-Lindenstrauss space, *New Zealand Journal of Mathematics*, Volume 37, No.1, pp.47-49.

Conference Papers : Submitted / Accepted

Bertoli, M., Ma, L., Stranieri, A., Sukhorukova, N., Ugon, J., Ganascia, J-G., Levy, P., Phillippe, C. & Ugon, A. (2008) The automated detection of micro-arousal events in non-rapid eye movement sleep data to facilitate sleep apnea diagnosis, *Health Informatics Conference HIC 2008* (submitted).

Dazeley, R. & Kang, B. (2008) Generalisation with Symbolic Knowledge in Online Classification, *The Tenth Pacific Rim International Conference on Artificial Intelligence (PRICAI-08)*, (submitted).

Dazeley, R. & Kang, B. (2008) Prediction using a Symbolic Based Hybrid System, *The Tenth Pacific Rim International Conference on Artificial Intelligence (PRICAI-08)*, (submitted).

Jia, L., Stranieri, A. & Shen, J. (2008) An Intelligent Learning Environment for Traditional Chinese Medicine practitioners and students *Health Informatics Conference HIC 2008, Melbourne* (submitted).

Jia, L., Stranieri, A. & Shen, J. (2008) The development of an Intelligent Learning Environment for Traditional Chinese Medicine practitioners and student. *Australian Acupuncture and Chinese Medicine Australasian Conference AACMAC 2008, Sydney, New South Wales* (accepted).



Macfadyen, A., Stranieri, A. & Yearwood, J. (2008) Dramatic Level Analysis for Interactive Narrative, *NILE 2008 Narrative in Interactive Learning Environments* (accepted).

Saeed, A., Stranieri, A., Dazeley, R. & Ma, L. (2008) Scalable Continuous Query Architecture for Online eCommerce and Legal Disputes, *SIWN International Conference on Adaptive Business Systems 2008, Glasgow, Scotland*, <http://siwn.org.uk/2008/ABS08.htm> (accepted).

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🌐 Web: <http://www.ballarat.edu.au/ard/itms/publications/CIAONewsletters.shtml>

Conference Papers : Published

McCombie, S., **Watters, P.A.**, Ng, A. & Watson, B. (2008) *Forensic Characteristics Of Phishing – Petty Theft or Organized Crime?*, Proceedings of the 4th International Conference on Web Information Systems and Technologies (WEBIST), Madeira, Portugal.

Research Reports : 2007-2008

- 2007/01 Uniform approximation by polynomial splines of the highest defect: necessary and sufficient optimality conditions and their generalizations, Nadezda Sukhorukova, February 2007.
- 2007/02 Optimization approach to clustering: the choice of a similarity function, A.M.Rubinov, N.Sukhorukova & J.Ugon, March 2007.
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- 2007/05 Effectiveness of Using Quantified Intermarket Influences for Predicting Trading Signals of Stock Markets, C.D.Tilakaratne, M.A.Mammadov, S.A.Morris & C. P. Hurst, July 2007.
- 2007/06 Development of Neural Network Algorithms for Predicting Trading Signals of Stock Market Indices, Chandima D. Tilakaratne, Musa A. Mammadov & Sidney A. Morris, August 2007.
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- 2008/02 Conditions of stationarity for best linear spline approximation with free knots, N.Sukhorukova & J.Ugon, April 2008.



Pictured right:
Professor John Yearwood,
Director of CIAO

Director of CIAO: Professor John Yearwood
Deputy Director of CIAO: Dr Andrew Stranieri

Founding Director of CIAO:
Professor Alexander Rubinov (1940-2006)

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