



CIAO Newsletter

Centre for Informatics & Applied Optimization

School of Information Technology & Mathematical Sciences

Edition Number 17 – Spring 2007

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News



Solar Cities Project

CIAO is very pleased to have won a \$3.1m portion of this new initiative to reduce Australia's energy consumption, and thereby reduce greenhouse gas emissions.

In early 2006 the Central Victorian Greenhouse Alliance (CVGA) invited the University of Ballarat to provide assistance and support to develop the evaluation component of their Solar Cities submission to the Australian Greenhouse Office.

Subsequently, in July 2007, the Australian Government Department of the Environment and Water Resources (formerly the Department of the Environment and Heritage) announced that CVGA was the successful tenderer, in winning the \$17m Victorian component of this major project.

For the University, this is a seven-year project which will be led by the Centre for Informatics and Applied Optimization (CIAO), and in collaboration with the Centre for Regional Innovation and Competitiveness (CRIC).

This is a complex project, and will involve the recruitment of 5000 households and 100 businesses across the Loddon Mallee and Grampians regions, monitoring the changes to their energy consumption over a seven-year period to 2013.

Interventions to be tested are:

- ⇒ Installation of solar hot water
- ⇒ Installation of photovoltaic energy generation
- ⇒ Demand management strategies
- ⇒ Behaviour change
- ⇒ Retrofitting households with energy saving measures

The two largest concentrations of households participating in the project will be in Bendigo and Ballarat. Householders will participate in all of the various interventions designed to reduce energy consumption. An extensive database will be developed to collate survey data, meteorological data and energy usage data from power companies, and to undertake statistical analysis of the collated data.

CVGA is an organisation comprising thirteen local governments and representation from eleven other organisations including businesses, government and community organisations.

We would like to acknowledge Mr Wayne Hurst's pivotal role in driving UB's ultimately successful contribution.

From the Editors

Welcome to the Spring Edition of our CIAO Newsletter.

Here in Ballarat we've recently enjoyed both rain and snow...



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

UB Open Day 2007

This year's Open Day was held on Sunday 26 August 2007. CIAO organised the following activities for visitors and potential research students to participate in:

- Hourly presentations by CIAO representatives about CIAO commercial projects and national competitive grants.
- Hourly presentations by ITMS Research Students, on their background, research topic and how they came to Ballarat.
- Aibo Robot Dog and CIAO-developed software demonstrations.
- A demonstration of the capabilities of our new Virtual Reality & Simulation Laboratory.



Pictured left (L to R) wearing 3D glasses in the VR Laboratory:
Dr Phil Smith &
Dr David Stratton

Humboldt Fellowship



Congratulations to Dr Zhiyou Wu (pictured left), who has won a Humboldt Fellowship from the Alexander von Humboldt Foundation in Germany.

The Alexander von Humboldt Foundation enables highly qualified, early-stage researchers from abroad, who hold doctorates, to carry out research projects of their own choice in Germany, for a six to twelve month period.

Research fellowships are offered world-wide on a competitive basis. The most important criteria for selection are the applicant's international publications to date, and the quality and feasibility of the research proposal.

Dr Wu will visit Germany in the first half of 2008.

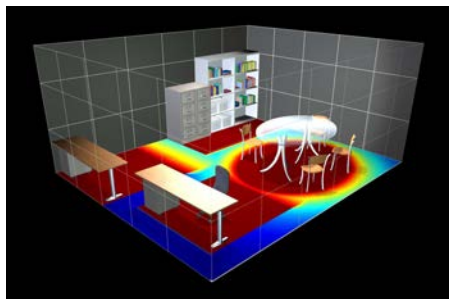
Virtual Reality Laboratory at Open Day

CIAO's new Virtual Reality & Simulation Laboratory (VRSL) was a very popular destination at the recent UB Open Day. Presentations were made every hour during the day to demonstrate some of the Laboratory's capabilities, with a full house at each screening and no standing room available.

Funding for the Laboratory was obtained from CIAO, the University of Ballarat, UB's School of Science & Engineering, and the Victorian Partnership for Advanced Computing (VPAC).

CIAO Personnel who were instrumental in creating the VR Lab are Mr Wayne Hurst and A/Prof John Yearwood, who developed the concept and funding options from late 2005, & Dr Peter Vamplew, Mr Glenn Stevens, Mr Ian Lee and Mr Troy Heland, who worked to make the Laboratory a 'reality'.

We will use the Laboratory to undertake research projects, & to demonstrate CIAO's optimization capabilities in projects such as the ARC Linkage Grant with Kann Finch. A formal launch of the Laboratory is also being planned.



Pictured left: Kann Finch 3-dimensional office space design and optimization project demonstration, in the VRSL

New Staff Member

We welcome Dr Ahmed Bani-Mustafa (pictured right), who recently joined us as an Applied Statistics Lecturer and CIAO Researcher.



Dr Bani has a Bachelor of Science degree (with a major in statistics) from Yarmouk University in Jordan, a Master of Mathematical Sciences, and a PhD from the University of Western Sydney.

He was born in Saudia Arabia, studied in Jordan & Australia, & is an Australian Permanent Resident. Dr Bani has significant experience in statistical consulting, including with the New South Wales Cancer Council, and has so far applied his statistical expertise to the areas of actuarial science, biostatistics and health sciences.

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Carrick Institute Awards Scheme

Congratulations to Dr Jason Giri, (pictured right) who recently won a \$10,000 Carrick Institute Australian Citation Award for excellence in teaching and learning.



His specific award was for the development and delivery of an innovative first year mathematics unit, which attracts and engages students and inspires further study in mathematics.

Dr Giri received his award at a ceremony and gala dinner held on 8 August 2007 in Melbourne.

Snow in Ballarat !

In July we were thrilled to experience a “real” winter with snow. Snow photos were taken by staff member Ms Marijke Groothuis.



News from:

CIAO Research Groups

Mathematical Analysis & Optimization Research Group (MAORG)

Group Leader:
Dr Adil Bagirov
(pictured right)



EURO XXII Conference in Prague

Dr Adil Bagirov and two colleagues were the organisers of a stream titled “Nonsmooth Optimization” at the EURO XXII Conference in Prague, Czech Republic, held on 8-11 July 2007. This stream was dedicated to the memory of Professor Alexander Rubinov.



Special Issue of JIMO

The special issue of the Journal of Industrial and Management Optimization (JIMO), Vol.3, No.2, May 2007, dedicated to the memory of Professor Alexander Rubinov has been published.

Dr Adil Bagirov was guest editor for this issue. It contains contributions provided by the participants of 5th Ballarat Workshop on Nonsmooth and Global Optimization: Theory, Methods and Applications, November 28-30, 2006.

Travel & Collaboration

- Dr Adil Bagirov, Dr Alex Kruger and Dr Zari Dzalilov visited Karlsruhe University, Germany on 13-17 July 2007, and presented lectures during their visit.
- Dr Adil Bagirov visited Saarbruecken University, Germany on 18-19 July 2007, and gave several lectures during his visit.
- Dr Zhiyou Wu visited the University of South Australia in June 2007, to work on joint research with Dr Regina Burachik.

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Data Mining & Informatics Research Group (DMIRG)

Group Leader:
A/Professor
John Yearwood
(pictured right)



Data Mining and Text Mining

- ✓ A/Professor John Yearwood, Dr Musa Mammadov, Dr Peter Vamplew, Dr Liping Ma and research students Mr Sol Hart, Mr Arun Banerjee and Mr Dean Webb have been looking at clustering ensembles for identifying and profiling groups in email data.
- ✓ A flash version of an interactive narrative tool to provide training in critical care nursing of ventilated patients is nearing completion. This version will permit on-site updating of inferences through an interface to a ripple down rules representation of knowledge.

Computational Intelligence

DMIRG was well represented at the recent 6th IEEE International Conference on Computer and Information Science (ICIS 2007) held at Rydges Hotel in Melbourne.

The following papers were presented by DMIRG members:

- ❖ Ghosh, R., Ghosh, M., Yearwood, J. & Mukherjee, S. (2007) A fully automated CAD system using multi-category feature selection with restricted recombination.
- ❖ Hart, S., Yearwood, J. & Bagirov, A. (2007) Visual tools for analyzing evolution, emergence and error in data streams.
- ❖ Huda, S., Yearwood, J. & Ghosh, R. (2007) A hybrid algorithm for estimation of the parameters of hidden Markov model based acoustic modeling of speech signals using constraint-based genetic algorithm and expectation maximization.
- ❖ Kulkarni, S. Image Retrieval Based on Fuzzy Mapping of Image Database and Fuzzy Similarity Distance.
- ❖ Pradhan, S. & Arkady (2007) A Smart Proxy for a Next Generation Web Services Transaction.
- ❖ Xie, W., Mammadov, M. & Yearwood, J. (2007) Using links to aid web classification.

Combinatorics, Graphs & Network Topology (CGANT)

Group Leader:
Professor Mirka Miller
(pictured right)



Professor Mirka Miller is currently in the United Kingdom on a Leverhulm Visiting Professorship.

Research

CGANT Research has continued to focus on the degree/diameter problem, magic and antimagic graph labelling, and the graceful conjecture for banana trees.

Conference Involvement

CGANT members have been actively involved as members of various steering, organizing and scientific committees of several international conferences and workshops including IWONT, CSGT, IWOCA, CATS and IWOGL.

Visitor to CGANT

Dr Kiki Sugeng (pictured right) is currently visiting CGANT.

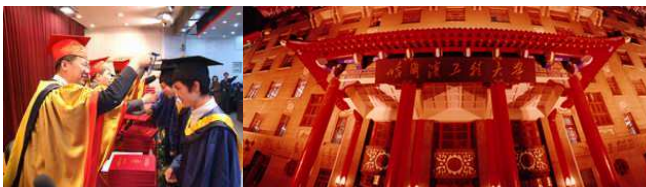


She is here to collaborate on research into autographs and monographs, and to finalise papers she has written on her recently awarded PhD thesis.

IWOGL 2008

Five local members of CGANT are members of the scientific committee of the International Workshop on Graph Labeling (IWOGL), which will be held at Harbin Engineering University, China in January 2008. Professor Mirka Miller will be a plenary speaker at the Workshop. More information is available at:

<http://demo.justsys.com.au/~IWOGL/local-info.html>



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Virtual Reality & Simulation Laboratory (VRSL)

Laboratory Leader:
Dr David Stratton
(pictured right)



VR at Open Day

We are very pleased that work on the Laboratory was recently completed, in time for UB Open Day on 26 August 2007. See full report on page 2.

Portico (Open Source RTI) Development

This project with Little Blue Frog Laboratories has been proceeding well, and is beginning to develop international impact.

World Engineering Anthropometric Resource (WEAR)

The WEAR project is moving along very well.

Health Informatics Laboratory (HIL) with the Collaborative Centre for eHealth



Laboratory Leader and
Manager of CCeH:
Mr Chris Lynton-Moll
(pictured left)

Current Projects

HL7 Australia & CCeH

CCeH has been the successful tenderer with HL7 Australia, to run HL7 Training Courses, running HL7 Workshops and Seminars for the next two years.

The HL7 Training Courses will be run in most capital cities from October 2007 to April 2008, and then repeated the following year. Workshops and Seminars will be run three times a year in Melbourne, Adelaide, Sydney and Brisbane.

CCeH will run its current battery of HL7 Training Courses, and will develop new courses for next year and beyond. Gross income from this project over two years is expected to be approximately \$250,000.

MedInfo 2007

CCeH provided HL7 messaging expertise for the Health Informatics Society of Australia (HISA) Interoperability Program at the MedInfo 2007 Conference, held in Brisbane in August 2007.

MEDINFO 2007

BRISBANE AUSTRALIA

Enhancing Communication Transfer: Ambulance Service and the Emergency Department

This is a collaborative project with Metropolitan Ambulance Service, Swinburne University, Victorian Quality Council, the Alfred Hospital and the University of Maryland.

The project will:

- ✓ Identify current practice in regard to the handover of information between paramedics and trauma teams, in receiving major trauma centres.
- ✓ Develop a conceptual framework for handover between paramedics and the receiving trauma team.
- ✓ Investigate the feasibility of transmitting a minimum dataset in transit or directly upon arrival in the Emergency Department, which can be displayed in trauma bays.
- ✓ Develop methodology to assess the effect of advanced transmission of data to hospital in reducing information loss, and in increasing accuracy of written documentation in the patient medical records.

ARC Linkage Grant: Sleep Disorder Diagnosis

This is a collaborative project with Griffith University. It will develop and implement a web-based sleep diary for Prince Charles Sleep Clinic, which will provide the following benefits:

- A visual representation of sleep patterns, which can be quickly assimilated by the sleep physician.
- Provide a data collection point for metrics of sleep patterns for further research.
- Present a holistic view of the patient's sleep patterns over a two-week period.
- Incorporate time and date stamping, to act as a check so that the questionnaire is filled in each day.

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- Provide the patient with an active tool to visualise sleep patterns, while waiting for an appointment.
- Provide increased information for the sleep physician during the initial consultation.
- Increase the information available to the physician, to categorise the patients into priority groups.



Completed Projects

The following projects have recently been completed:

- ✓ Development of Australian Messaging Standards for Standards Australia.
- ✓ Development of Pathology Structured Document for Results Reporting for NEHTA.
- ✓ Grampians Integrated Cancer Services (GICS) IT Strategic Plan for GICS.
- ✓ Northern West Managed Health Network for Barwon Division of General Practice.



Information Security Cluster (INSECT)

Next report will be provided in Summer 2007 Edition.

Commercial Projects

Business Development
Manager
Mr Wayne Hurst
(pictured right)



Current Projects

Ballarat ICT 2030

The final report for this important project was presented to the Board of cBallarat (now known as Ballarat ICT Ltd) earlier in the year.

The official launch of the report will take place on 25 September 2007 at the Greenhill Enterprise Centre, on UB's Mt Helen Campus in Ballarat.

Solar Cities – Central Victoria Greenhouse Alliance

This new project was won in July 2007 (see page 2 report). Since then, an initial meeting was held on 14 August 2007 in Melbourne, and attended by representatives from:

- Central Victoria Greenhouse Alliance (CVGA)
- Australian Greenhouse Office (AGO)
- Sustainability Victoria
- Bendigo Bank
- Powercor
- Origin Energy
- University of Ballarat

AGO provided an overview of the total Solar Cities concept from a Federal perspective. All Solar Cities projects have unique attributes, and AGO complimented CVGA on its structure and implementation plans for the project.

The lead organisation for Solar Cities will be Sustainable Regional Australia Pty Ltd, trading as ZCO2e.

Key activities over the next two months, which will require significant input from UB and CIAO, include:

- Determining legal structure for consortium members.
- Reviewing original proposal.
- Budget review.
- Drafting of Ethics application.
- Building of database: downloadable to AGO system.
- Web access security levels.
- Defining milestones.

CIAO Personnel: J Yearwood, W Hurst, C Lynton-Moll, A Bani-Mustafa, P Martin
Research Group: DMIRG



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Calytrix Technologies – JaRTI Open RTI

This project will provide programming support to assist Calytrix Technologies in further developing the JaRTI Open RTI open source software, to enable it to integrate with Australian Defence Force applications.

Status: Work is progressing well.

CIAO personnel involved: D Stratton, M Fraser
Research Group: VRSL

Australian Defence Force: Anthropometry Project

This project will provide programming support to assist Calytrix Technologies in further developing the JaRTI Open RTI open source software, to enable it to integrate with Australian Defence Force applications.

CIAO is part of a consortium, collaborating with the University of South Australia, the Australian Sports Commission, Sinclair Knight Merz and Permian (now known as SMS Defence Solutions) to determine optimal fit of crew to air crewstations.

CIAO's responsibility involves integrating the scanned crewstations and the extracted body measurements in an interactive modelling program, to determine fit, reach and comfort.

Status: Project close to completion

CIAO personnel involved: J Yearwood, D Stratton, P Smith
Research Group: VRSL

Grants

Grants Awarded

VPAC – Virtual Reality Development

CIAO has been successful in receiving additional funding from the Victorian Partnership for Advanced Computing (VPAC), for the development of VR content specific to CIAO's research capability.

The developed content will be used in demonstrations of the VR capability to UB Schools, and to commerce and industry.

The funding has been used to engage VPAC experts who will work with CIAO researchers on the development of the content.

Funding awarded: \$8,300

CIAO personnel involved: S Morris, J Yearwood, P Vamplew
Research Group: VRSL

Grant Applications: Submitted

Australian Academy of Science: Scientific Visit to Europe in 2008

Topic: ICT based tools for modelling and simulation of human physiology and disease related processes

Collaborator: Professor Franco Giannessi, Department of Mathematics, University of Pisa, Italy

Funding sought: \$6,700

Applicant: Dr Zari Dzalilov

Research Group: MAORG

Australian Academy of Science: Scientific Visit to Europe in 2008

Topic: Classification of Optimization Problems into Complexity Classes Using a Finite Model Theory Approach

Collaborator: Professor Iain Stewart, Department of Computer Science, University of Durham, England

Funding sought: \$10,500

Applicant: Dr Prabhu Manyem

Research Group: MAORG



French Australian Science & Technology (FAST) Programme 2008

The FAST Programme promotes and supports scientific and technological co-operation between Australian and French researchers in both public and private sectors.

Support to successful Australian applicants will be provided by the Federal Department of Education Science & Training (DEST), and support to French beneficiaries is provided by the French Government in France.

Financial assistance is provided for small, strategically-focussed workshops and for collaborative research projects in leading edge areas of research.

Collaborative partner:

Professor Evelyne Flandrin, Université Paris-Sud, France

Funding sought: to pay for collaborative visits to France and Australia.

CIAO Applicants: Professor Mirka Miller & Dr Joe Ryan
Research Group: CGANT



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7th Research & Development Framework Programme (7FP), 2007-2010

Dr Zari Dzalilov has submitted an application to this European Union-funded program.

Application: to participate in working packages:

- ✓ WP1: Oncology of breast and colon.
- ✓ WP3: Mechanisms related to tumorigenesis (cell differentiation, tumor onset in colon crypts, etc).

Applicants: Dr Zari Dzalilov (leader), Dr Adil Bagirov, Dr Musa Mammadov.
Research Group: MAORG

Conferences & Seminars

Conference Attendance & Presentations

British Combinatorics Conference

Professor Mirka Miller and Dr Joe Ryan attended the British Combinatorics Conference, Reading, UK in July 2007.

8th International Conference on Fixed Point Theory and Its Applications

Dr David Yost was a Plenary Speaker on the topic of "Uniformly non-hexagonal Banach Spaces" at the 8th International Conference on Fixed Point Theory and Its Applications, 16-22 July 2007, in Chiang Mai, Thailand.



Pictured left (L to R):
Dr David Yost,
Dr Alex Kruger

Erice Workshop

Dr Nadia Sukhorukova and Dr Julien Ugon presented papers at the Erice Workshop: New problems & innovative methods in nonlinear optimization, 31 July to 9 August 2007, in Erice, Italy.

EURO XXII Conference

Dr Adil Bagirov, Dr Alex Kruger and Dr Zari Dzalilov presented papers at EURO XXII Conference, 8-11 July 2007, in Prague, Czech Republic.

International Workshop On Network Topologies 2007 (IWONT)

Professor Mirka Miller, Mr Jianmin Tang and Mr Guillermo Pineda Villavicencio attended the International Workshop On

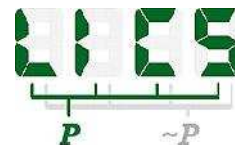
Network Topologies (IWONT), September 2007, at Pilsen, Czech Republic. Professor Miller was an invited speaker.

Joint EUROPT-OMS Meeting

Dr Adil Bagirov, Dr Alex Kruger, Dr Zari Dzalilov, Dr Nadia Sukhorukova and Dr Julien Ugon presented papers at the Joint EUROPT-OMS Meeting: 2nd Conference on Optimization Methods & Software and 6th EUROPT Workshop on Advances in Continuous Optimization, 4-7 July 2007, in Prague, Czech Republic.

Logic in Computer Science & International Conference on Automata, Languages and Programming

Dr Prabhu Manyem attended this conference on 9-15 July 2007, in Wroclaw, Poland.



MedInfo Conference

Mr Chris Lynton-Moll attended the MedInfo 2007 Conference on 20-24 August 2007 in Brisbane, Queensland.

ITMS Colloquia & Seminars

ITMS Colloquia Series 2007

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



Recent presentations in the Colloquia Series were:

- *Web Communities Analysis and Construction, and e-Research @ VU*
Professor Yanchun Zhang, School of Computer Science and Mathematics, Victoria University, Melbourne
- *The use of algebra in determining strengths and weaknesses of cryptographic systems*
Professor Lyn Batten, Director, Information Security Group, Deakin University, Geelong, Victoria
- *Dilemmas in Military Decision-Making in a Post-Industrial World*
Professor William Hutchinson, IBM Chair (Information Security), School of Computer and Information Science, Edith Cowan University, Perth

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ITMS Seminar Series 2007

Recent presentations were:

- ⇒ *Grobner Bases and Linear Codes*
Professor Shuhong Gao, University of Clemson, South Carolina, USA
- ⇒ *Free and Open Source Software*
Dr Neville Richter, Director, Centre for Open Source Development, Faculty of Business and Informatics, Central Queensland University.
- ⇒ *Why Linux? Demonstration*
Dr Neville Richter, Director, Centre for Open Source Development, Faculty of Business and Informatics, Central Queensland University.

Visitors to CIAO

Recent visitors include:

- ✓ Professor Shuhong Gao

Professor Shuhong Gao visited CIAO as a special guest of Dr Xinwen Wu in July 2007, to work together collaboratively.

Professor Gao is from the University of Clemson, in South Carolina, USA. He is an active researcher in the area of Cryptography, and is on the editorial boards of "Codes, Designs and Cryptography" and "Finite Fields and Their Applications".

Staff News

Welcoming New Babies

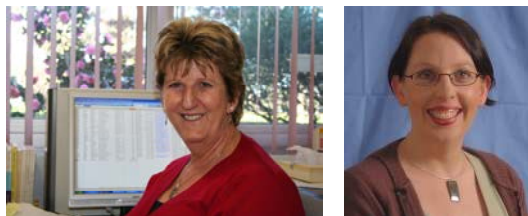
- Congratulations to Dr Greg Simmons and his wife Peta on the arrival of their daughter Ruby Jayne.
- Congratulations to Mr Scott Hebbard and his wife Kerry on the arrival of their daughter Zoe Rose.

Pictured right
(L to R):
Dr Greg Simmons,
Mr Scott Hebbard
(& friend)



New Staff

- Welcome to Ms Yve Rowe, who recently joined us in the role of Personal Assistant to the Director of CIAO.
- Welcome to Ms Sue Jones, who will work in the role of Administrative Officer (Student Liaison) for ITMS over the next 14 months, while Julie Howes is on maternity leave. All the best Julie!



Pictured above (L to R): Ms Sue Jones & Ms Julie Howes

Pictured below: Ms Yve Rowe



Post-graduate News

New Research Student

We welcome one new research student:

- ✓ **Mr Desmond Lobo**

Degree: PhD

Topic: Implementing Elliptic Curve Cryptography Using Java

Principal Supervisor: Professor Mirka Miller

Associate Supervisors: Dr Xinwen Wu

Research Student Meetings

Dr Andrew Stranieri has been having regular group meetings with our research students, in his role as Acting Research Higher Degrees Co-ordinator, while Prof Mirka Miller is away.

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Theses Submitted

The following students have recently submitted their theses for examination:

Student: **Mr Jakub Teska**
Degree: PhD
Topic: Graphs with bounded degree
Principal Supervisor: Professor Mirka Miller
Assoc Supervisors: Dr Joe Ryan
Prof Z. Ryjacek (Czech Republic)
Prof E.T. Baskoro (Indonesia)

Student: **Ms Chandima Tilakaratne**
Degree: PhD
Topic: Discovering Inter-related Financial Markets
Principal Supervisor: Dr Musa Mammadov
Assoc Supervisors: Prof Sid Morris & Dr Cameron Hurst

Pictured right
(L to R):

Ms Chandima
Tilakaratne,
Mr Jakub Teska



Publications

Journal Papers : Submitted / Accepted

Bagirov, A. (2007) Continuous approximations to subdifferential, *Encyclopedia of Optimization* (accepted).

Bagirov, A. (2007) Derivative-free methods for nonsmooth optimization, *Encyclopedia of Optimization* (accepted).

Bagirov, A., Karasozen, B. & Sezer, M. (2008) Discrete gradient method: derivative free method for nonsmooth optimization, *Journal of Optimization Theory and Applications*, March 2008 (accepted).

Bagirov, A. & Beliakov, G. (2007) Global optimization: Cutting angle method, *Encyclopedia of Optimization* (accepted).

Bagirov, A. (2007) Nonsmooth optimization approach to clustering, *Encyclopedia of Optimization* (accepted).

Bai, F.S., Wu, Z.Y. & Zhu, D. L. (2007) Sequential Lagrange Multiplier Condition for ϵ -Optimal Solution in Convex Programming, *Optimization* (accepted).

Bai, F.S., Mammadov, M., Wu, Z.Y. & Yang, Y.J. (2007) A Filled Function Method for Constrained Nonlinear Equations, *Pacific Journal on Optimization* (submitted).

Bai, F.S. & Wu, Z.Y. (2007) Quadratic Smoothing Approximation to $\frac{1}{2}$ -Order Exact Penalty Function, *Asia-Pacific Journal of Operational Research* (submitted).

Bani-Mustafa, A.S. (2007) Folded Ranked Set Sampling for Asymmetric Distributions, *Journal of Modern Applied Statistical Methods* (accepted).

Bani-Mustafa, A.S & Al-Nasser, A.D. (2007) On Estimating the Variance of Maximum Entropy Median for Odd Sample Size, *Pakistan Journal of Statistics* (accepted).

Dazeley, R.P. & Kang, B.H. (2007) Epistemological Approach to the Process of Practice, *Mind and Machines* (submitted).

Dmitruk, A.V. & Kruger, A.Y. (2007) Metric regularity and systems of generalized equations, *Journal of Mathematical Analysis and Applications* (submitted).

Dzalilov, Z. & Ouveysi, I. (2007) Mathematical Models of Dynamic Reconfiguration of Telecommunication Networks, Part 1, *Optimization* (submitted).

Dzalilov, Z. & Ouveysi, I. (2007) Mathematical Models of Dynamic Reconfiguration of Telecommunication Networks, Part 2, *Optimization* (submitted).

Dzalilov, Z., Ouveysi, I. & Rubinov, A. (2007) A lifetime measure for telecommunication network: theoretical aspects, *Journal of Industrial and Management Optimization (JIMO)* (submitted).

Hafen, G., Hurst, W., Yearwood, Y., Smith, J., Dzalilov, Z. & Robinson, R. (2007) A new clinical scoring system in Cystic Fibrosis: statistical tools for database analysis - a preliminary report, *BMC Medical Informatics and Decision Making* (accepted).

Herbert, S. (2007) An 'emergent model' for rate of change, *International Journal of Computers for Mathematical Learning* (submitted).

Kruger, A. (2007) Nonsmooth analysis: Frechet subdifferentials, *Encyclopedia of Optimization* (accepted).

Kruger, A. (2007) Nonsmooth analysis: Weak stationarity, *Encyclopedia of Optimization* (accepted).

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Ma, L., Yearwood, J. & Banerjee, A. (2007) Clustering Emails using Orthographic Features (submitted).

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Pictured right:
Ms Neroli Sawyer



Wu, Z.Y. & Bai, F.S. (2007) Global optimality Conditions for Mixed Nonconvex Quadratic Programs, *Optimization* (accepted).

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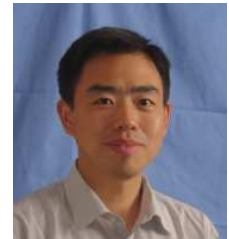
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Pictured right:
Dr Xinwen Wu



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Conference Papers : Submitted / Accepted

Bai, F.S., Wu, Z.Y., Yang, Y.J. & Mammadov, M. (2007) A global optimization method for integer nonlinear systems, in *Proceedings of ICOTA 7*, 12-15 December, 2007, Kobe, Japan (submitted).

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- 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 Optimisation approach to clustering: the choice of a similarity function, A.M.Rubinov, N.Sukhorukova & J.Ugon, March 2007.
- 2007/03 Some Indecomposable Polyhedra, David Yost, March 2007.
- 2007/04 Predicting Stock Market Index Trading Signals Using Neural Networks, C. D. Tilakaratne, S. A. Morris, M. A. Mammadov & C. P. Hurst, July 2007.
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- 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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