



Research Newsletter

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A Few Words from the School Research Coordinator

The last few months have been hectic with the University considering its position in the light of the white paper on research. The University and SITMS in particular should be pleased with the progress made in research in the short period since becoming a University. Having moved rapidly to achieve a reasonable number of Higher Degree by Research students we are in danger of losing funding to maintain this number.

Projects in Progress

Dr Jack Harvey has joined a research team headed by Dr Mark Yates and Ms Keren Day of Ballarat Health Services, which has successfully applied for a grant of \$200,000 to undertake research into the prevention of constipation in elderly people in extended care and residential facilities. The research will take place over the next 12-15 months.

Federal Funding Changes

Due to Federal Government funding changes it is possible that a reduction in the

University's higher degree by research student places may be incurred.

There are two key points to be noted:

1. Existing higher degree by research students will have their funding "grandfathered" (DETYA term) so that they will not be affected by any of the changes, and be able to continue their studies. This includes students in both DETYA funded places and those in so-called "gap" places. Course-work postgraduate student places will not be altered by any of these changes.

2. The exact number of new HDR places to be allocated to the University in future years will depend upon the University's research performance under the new funding formula. Places will be allocated competitively amongst universities, calculated on the basis of higher degree by research completions (50% of formula), external research income (40%) and publications (10%). It is essential that our performance in all these areas is maximised over the next two years, and the Research Committee and the Office of Research are consulting and developing programs to ensure this result.

Visitors to the School

The School welcomes **Philip Downum** who is here on a teaching exchange program for six months. Philip is from SUNY Oswego.

Professor Alexander Ioffe visited the School from 6/7/00 – 3/8/00.

Alexander Ioffe is an outstanding expert in the area of theoretical optimisation and the so called non-smooth analysis. It is enough to say that for the past five years he was invited to speak at more than 10 international conferences. He visits our school in the framework of the project "Global Minima in Optimization Problems" funded through the International Researcher Exchange Scheme (IREX). Alexander is originally from the Soviet Union, although now he is a Professor at the Technion, (a leading Israel Technological University). He visited Ballarat in 1997, when he attended the international workshop. Alex Ioffe and Alex Rubinov are preparing the first draft of a joint paper in the field.

Professor Alex Rubinov's Trip

Professor Alex Rubinov recently visited Russia (St Petersburg and Moscow) for 6 days where he attended some very interesting and useful meetings with Russian colleagues. Alex presented a talk at an institution called 'European University St Petersburg' and also discussed some joint projects with Professors V. F. Demyanov, Y. G. Evtushenko and V. G. Zhadan who are associate investigators for Alex's large grant 'Dual Methods for the Solution and Analysis of Structured Optimization Problems'.

Alex also visited universities in Venezia, Verona and Rome where he presented lectures and had some very useful discussions especially with Professors Di Pillo and Lucidi 'University la Sapienza', Rome and his co-author Amos Uderzo from Verona.

Alex also attended two international meetings in Italy and Greece.

Conferences

During the break **Robyn Pierce** attended the 4th International DERIVE TI92/89 Computer Algebra in Mathematics Education Conference held in Liverpool UK. Robyn presented a paper titled "Algebraic Insight and Students' use of DERIVE". The conference provided an opportunity for Robyn to meet many of the key researchers and writers in this field some of whom provided insightful criticism of her work.

En route to the conference Robyn spent time with Josef Bohm, Neil Challis and Harry Gretton. Josef is, Chair of the International DERIVE user group and Chair of T3 Austria. He has many years of experience in the use of CAS with secondary students. Neil and Harry have used CAS to expand the range of students and range of mathematics taught at tertiary level.

Christopher Turville presented a paper entitled 'A comparison of various techniques to handle missing values in a factor analysis' at the 15th Australian Statistical Conference in Adelaide (July, 2000).

David Stratton attended the **ITicSE 2000 in Helsinki** – This is the Innovation and Technology in Computer Science Education conference - the non-US conference of the ACM Special Interest Group on CSE.

(The main SIGCSE conference is held in the northern spring each year in the US and thanks to Tony Greening's representations is no longer going to clash with southern hemisphere teaching times!)

David's paper (co-authored with Glenn Stevens and Tony Greening) "A Case for Data-Driven Testing" which described some of the automated, computer based testing that we have been using in the NPS and NOS units. This was the subject of a local seminar some months ago.

David also conducted a poster session describing the NPS Unit - "Network Protocols and Services - a Non-Specialist Approach to Teaching Networking" and for him this was the highlight. David had not given a poster session before and David would now choose this over a paper session (if that were a reasonable choice!). The reason being that the people that turn up and listen are very specifically interested in the topic and the presentation, which described the thinking and methodology behind our teaching of networking to first-years, created extensive interest from institutions around the world that are considering similar initiatives.

A central component of NPS is NetSim, the network simulation that David has written as a component of his DIT, and there are now maybe half a dozen sites that are interested in using NetSim.

This was David's first opportunity to present NPS & NetSim to colleagues outside of UoB and the reception confirmed his hunch that we are indeed ahead of the game in the way that we teach networking here.

Alex Rubinov and **Adil Bagirov** attended the international conference "Advances in Convex Analysis and Global Optimization" in Samos, Greece, June 5-9 2000. (Samos is the birthplace of Pythagoras). Alex was invited to give a talk 'Abstract Convexity and Global Optimization', which was based on his book.

Adil and Alex also presented a talk 'The Cutting angle method in Global Optimization'. Many experts from the USA, Greece, Italy, Germany, Israel, France, Vietnam and other countries took part in this conference. The meeting allowed one to understand the area of global optimisation and some of its applications. The Proceedings of this meeting will be published by Kluwer Academic Publishers.

Zari Dzalilov attended the 44th Annual meeting of the Australian Mathematical Society, at the University of Queensland, Brisbane, from 2–5 July and presented a talk "Difference inclusions with delay of economic growth".

Seminars

7 presentations by our Honours students (Chaula Anjaria, Prakesh, Andrew Richter Darrin Robinson, Cameron Foale Kyle Buttress and Tim Feltham) were given during the break. The presentations attracted much interest in their topics and scope.

Workshops

Alexander Rubinov attended the workshop "Equilibrium Problems and Variational Models" held in Erice, Sicily 23/6/00 – 2/7/00. Alex gave two invited lectures: 'Abstract Convexity and Global Optimization' and 'The cutting angle method and economic equilibrium'. There were many interesting and useful discussions and lectures. This was the 32nd workshop for the International School of Mathematics 'G. Stampacchia' at Erice. According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (750 metres above sea level) more than three thousand years ago. The workshop was held in a former monastery. There is a special room at this monastery with two barrels of Sicilian wine 'Macella', which is very good wine.

Accepted Papers

Paul Kelly and **Lyn Roberts** have had their paper 'Challenges for university administrators in the on-line world' accepted to be published in Perspective, Volume 44:4.

Published Papers

The following papers have recently been published:

Philip A. Smith and **Geoffrey I. Webb's** paper 'The Efficacy of a Low-Level Program Visualization Tool for Teaching Programming Concepts to Novice C Programmers' was published in the journal of Educational Computing Research Volume 22, Number 2 – 2000.

A. Rubinov and **I. Singer's** paper 'Distance to the intersection of normal sets and applications' has been published in the international journal Numerical Functional Analysis and Optimization, vol 21, pp. 521-536.

The papers 'Star-shaped sets with respect to infinity' by **A.M. Rubinov** and **A.P. Shveidel** and 'Nonlinear unconstrained optimization methods: a review' by A.M. Rubinov X. Q. Yang and B.M. Glover have been published in the volume, Progress in Optimization, Z.Q. Yang et al, eds Kluwer Academic Publishers, 2000 pp 45-63.

The paper 'A generalization of the Perron-Frobenius Theorem' by P. Kloeden and A.M. Rubinov has been published in the international journal 'Nonlinear Analysis, Theory, Methods and Applications', vol. 41 (2000), pp. 97

Published Books

The following books have recently been published:

A.M. Rubinov 'Abstract convexity and global optimization' has been published by Kluwer Academic Publishers.

The Volume (collection of papers) 'Quasidifferentiability and related topics:', edited by **V.F. Demyanov** and **A.M. Rubinov** also has been published by Kluwer Academic Publishers. The camera-ready copy of this book was prepared by Adil Bagirov.

'Radiant sets and their gauges' and 'Differences convex compacta and metric spaces of convex compacta with applications' by **A.M. Rubinov** and **A.A. Vladimirov** have been published in this volume.

Copies of both mentioned books were presented at Kluwer exhibition at Samos and Erice.

Post Graduate News

Adil Bagarov has been successful in his transfer from probationary candidature to full PhD candidature. Adil's confirmation document 'Dual Methods for the Solution and Analysis of Structured Optimization Problems' was outstanding with ten of Adil's papers being submitted, accepted and published in the past 12 months.

This semester **Kris Gardiner** joined the ranks of Honours students which makes a total of 7 students enrolled in Honours.

Musa Mammadov will commence his PhD under the supervision of Professor Alex Rubinov in the area of fuzzy mathematics.

Raouf Veliev has been recommended to RHDC for the award of the degree of Doctor of Philosophy.

Research Reports

00/13	Clustering via D.C. Optimization ¹	Hoang Tuy	July 2000
00/14	On Global Optimality Conditions via Separation Functions ¹	A.M. Rubinov ² , A. Uderzo ³	July 2000
00/15	Global optimization of marginal functions with applications to economic equilibrium ¹	A.M. Bagirov and A.M. Rubinov	July 2000
00/16	A framework for designing a decision support system to support discretion	Tunde Meikle and John Yearwood	July 2000
00/17	On some classes of abstract convex functions ¹	A.M. Rubinov and A.P. Shveidel	September 2000

All IT&MS staff members and postgraduate students are encouraged to contribute to the next edition of the monthly ITMS Research Newsletter. Examples of newsletter items staff should consider are: projects in process, papers accepted, research in process, publications, grants, seminars, visitors, visits by ITMS staff and Post graduates, scholarships, reports from school research groups / centres, events, conferences, new discoveries, general items of interest, etc. All items should be received by Maxine Kingston no later than the 30th October 2000.



University of Ballarat



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