

Summary of Discovery Projects Applications for Funding to Commence in 2006

South Australia

University of South Australia

DP0666632 Prof JA Filar; Dr SK Lucas; Prof VS Borkar; Prof W Murray

Approved Project Title **Doubly Stochastic Matrices & The Hamiltonian Cycle Problem**

2006 : \$110,000

2007 : \$111,000

2008 : \$112,000

2009 : \$113,000

2010 : \$114,000

Primary RFCD 2301 MATHEMATICS

APF Prof JA Filar

Administering Institution University of South Australia

Project Summary

The classical hard problem of determining whether a given graph possesses a Hamiltonian cycle contains the essential difficulty of the famous 'Travelling Salesman Problem'. A characterisation of this difficulty in terms of variability of returns (to the initial state) in a controlled stochastic process will be a significant conceptual advance with repercussions in a number of fields including optimisation and theoretical computer science. Algorithmic advances exploiting such a characterisation will significantly contribute to existing technologies for solving problems in applications ranging from logistics to cryptography. Since TSP describes certain efficient ways of routing its applicability to information networks is clear.

DP0664330 Prof V Gaitsgory

Approved Project Title **Occupational Measures Approach to Long Run Average and Singularly Perturbed Optimal Control Problems**

2006 : \$73,000

2007 : \$75,000

2008 : \$77,000

Primary RFCD 2301 MATHEMATICS

Administering Institution University of South Australia

Project Summary

Problems of optimal control of long-run average and singularly perturbed systems arise in many applications. The project will lead to the development of new linear programming based techniques for analyzing these problems (including problems intractable so far) and finding their numerical solutions. The new techniques will have a potential to be further developed into software that can benefit Australian industries and technologies. The proposed topic is in the focus of interest of many eminent researchers around the world and the dissemination of our results will further improve Australia's standing in the international research community.

DP0667206 Dr J Liu

Approved Project Title **Normalizing XML Documents**

2006 : \$140,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Institution University of South Australia

Project Summary

Our work will be of great benefit, both to the research community and to the ICT industry. The project addresses one of the most important problems in XML usage and we expect our results to be published in important international forums, as has our preliminary research on the topic. This will significantly improve Australia's reputation in research in the ICT area. In the longer term, we intend to build commercial software tools based on the results of our research and this will be of direct benefit to the Australian economy and the Australian ICT industry.

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DP0666677 Dr Z Lu; Dr J Trogon

Approved Project Title **The effects of child disability on carer's labour market outcomes in Australia**

2006 : \$28,988

2007 : \$28,955

2008 : \$31,745

Primary RFCD 3402 APPLIED ECONOMICS

Administering Institution University of South Australia

Project Summary

Increasing prevalence of children with disabilities in Australia accompanied by lack of research makes this study imperative. The innovative approach adopted in this project means there will be a number of national benefits resulting from this study.

- It will help governments in Australia make more informed policies toward providing assistance to affected families, which will reduce the burden on families caring for children with disabilities.
- More informed policy will improve the well-being of such children.
- It will advance knowledge in the fields of labour and health economics, and econometrics, and hence enhance Australian research reputation in the fields.

DP0663567 Prof LK Rasmussen; Prof AJ Grant

Approved Project Title **Complexity Constrained Iterative Information Processing**

2006 : \$133,000

2007 : \$99,000

2008 : \$107,000

Primary RFCD 2805 DATA FORMAT

Administering Institution University of South Australia

Project Summary

The contribution of Information and Communications Technologies to the National Economy has been widely recognized. ICT enables wealth creation, employment and exports, and underpins many innovation processes. Immediate project benefits will be: Contribution to the knowledge base and fundamental capabilities in high-speed wireless communications networks; Education of future Australian academic and industrial innovators; Raising the international profile of Australian research in the area of information technology. Applied development of the outcomes will lead to the generation of valuable intellectual property. Close links to Australian industry ensures that Australian ICT companies stand to gain commercial advantage.