

School of Information Technology

Research Report 2003

<http://www.it.swin.edu.au/centres>

School Research Committee
September 2004



SWIN
BUR
NE

SWINBURNE UNIVERSITY
OF TECHNOLOGY

Table of Contents

Message from Dean of IT and Head of School	1
Message from Chair of Research Committee	2
Centre for Component Software and Enterprise Systems (CeCSES)	3
Projects	3
Centre for Intelligent Agents and Multi-Agent Systems (CIAMAS)	7
Projects	7
Centre for Internet Computing and E-Commerce (CICEC)	8
Projects	8
Centre for Intelligent Systems and Complex Processes (CISCP)	12
Projects	12
Centre for Molecular Simulation (CMS)	16
Projects	16
Centre for Software Engineering (CSE)	20
Projects	20
Information Technology Innovation Group (ITIG)	22
Projects	22
Swinburne Computer-Human Interaction Laboratory (SCHIL)	24
Projects	24
Refereed Publications	27
Book Chapter	27
Journal	27
Conference	28
Grants	32
Current Grants in 2003	32
Grants Awarded in 2003 for 2004	34
Research Students	35
International Visitors	38
School Seminars	39

Message from Dean of IT and Head of School



Professor Douglas D Grant

2003 was a year of further advancement for research in the School of Information Technology. We were pleased to welcome Professors Jun Han, Tim Hendtlass and Ryszard Kowalczyk – all of them with excellent research track records, and promising significant benefit to the School. And so it has transpired, with the establishment of several new projects, the rapid building of new research teams, and unprecedented success in attracting new scholarship-funded research students.

Together with our existing research strengths, the addition of the new areas enables us to claim our research-intensive status with a new authority, and to ensure that IT is recognised, in its own right, as a true research strength of the University.

During 2003, significant research grants were won by staff in the School, as described in detail in this report.

In 2004, the School is joining with the telecommunications and astrophysics disciplines from the School of Biophysical Sciences and Electrical Engineering to form a new Faculty of Information and Communication Technologies. This Faculty will have a very strong research profile, and promises to take leadership in the University's continuing research trajectory. Thus, this is the last Research Report of the School of Information Technology. As Head of School, I would like to thank all research-active staff in the School for their contribution to research over the last seven years. Much has been achieved in that time, and a great foundation has been laid for the future.

Professor Doug Grant

Head of School, School of Information Technology

Dean-Elect, Faculty of Information and Communication Technologies

Message from Chair of Research Committee

In 2003, Swinburne University of Technology was continuing to progress towards the mission goal of being a research-intensive university. The School had the following major research centres and groups (alphabetical order):

- CeCSES – Centre for Component Software and Enterprise Systems (*newly established*)
- CIAMAS – Centre for Intelligent Agents and Multi-Agent Systems (*newly established*)
- CICEC – Centre for Internet Computing and E-Commerce
- CISCP – Centre for Intelligent Systems and Complex Processes (*together with School of Biophysical Sciences and Electrical Engineering*)
- CMS – Centre for Molecular Simulation
- CSE – Centre for Software Engineering
- ITIG – Information Technology Innovation Group
- SCHIL – Swinburne Computer-Human Interaction Laboratory

The School was aiming at well-focused research areas to maximise outcomes with the available resources in order to have a higher number of quality publications, to be awarded more research income, and to attract more research students. In 2003, in terms of DEST measurement, the total publication points jumped to over 60 in comparison to about 40 in 2002. In particular, over 20 points were journal publications, a huge improvement. External grants for research funding in 2003 were significantly improved, particularly the industry income, as detailed in this report. The School enrolled 9 new research students, and 2 PhD and 1 Masters by Research students were awarded the degree in 2003. However, 2003 was a very fruitful year for the School to win 11 university scholarships for 2004 enrolment. Therefore, in the near future, we will see more graduations.

It was a busy year in 2003 with several new professors joining the School and consequently established their research centres. More importantly, School strategic research planning was intensively discussed by senior researchers founding several well focused themes. I believe that the niche theme on service-oriented computing now has a critical mass and is aimed at achieving the status of national prominence and international recognition in 3-5 years.

This report contains major research activities in 2003 within the School. It addresses the missions of research centres with associated staff, research projects, grants and research students. It also includes information of international visitors and the School Seminar Series. There are many other ongoing activities that can be accessed on the School research Web site.

Without the team effort of staff and students, nothing would be possible.

Associate Professor Yun Yang
Chair of Research Committee, School of Information Technology

Centre for Component Software and Enterprise Systems (CeCSES)



Director: Professor Jun Han

CeCSES conducts research into component-based engineering of software and enterprise systems, focusing on the development of advanced methods, techniques and tools. It addresses real-world goals for real-world systems with practical and scientifically based solutions. We have internationally recognised expertise in software composition, software interoperability, software security, software performance, dynamic and adaptive software systems, distributed object and component technologies, enterprise system architectures, system integration and evolution. We also provide consultancy to industry and governments in our areas of expertise.

Andrew Cain
Prof Jun Han (Director)
Toby Hede

Dr Lorraine Johnston
Dr Jean-Guy Schneider
Rajesh Vasa

Projects

Compatible and Viable Software Interactions

J Han, K K Ker et al

A key issue in composing software systems from independently developed components is how to ensure that the software components interact with each other in the context of the composite system without violating the original interaction intentions of the individual components. The interaction intentions of the components are their interaction protocols. This project aims to develop a formal and practical notation for specifying the component interaction protocols, and to develop associated techniques and automatic tools for design-time compatibility checking of component interaction protocols and run-time validation of component interactions against protocol specifications.

Effective Management of Systems Requirements and System Architectures

J Han et al

This project aims to develop practical techniques and tool support for the component-based management of system requirements, system architectures and their traceability. It involves collaboration with University College London, UK National Air Traffic Services (NATS) and Nanjing University of Aeronautics and Astronautics. A start-up kit for software systems engineering projects has been developed, including an information model, a process guide, a set of document templates and associated tool support. The kit has been used in "live" projects at UK NATS. Current research focuses on improving the approach and tool and on implementing them with the XML technology.

Empirical Study into Architectural Impact of Object-Oriented Software Evolution

R Vasa, J-G Schneider, J Han et al

In this project, we aim to identify and examine the impact of object-oriented software evolution on the system architecture, by studying and analysing at the source code level the successive versions of a number of large-scale object-oriented software systems. The key research issues include selection and definition of architectural metrics, collection and analysis of metrics data from the targeted data set, and identification of architectural evolution patterns.

Enterprise System Architectures

J Han et al

The architecture of an organisation's enterprise systems form a key part of the organisation's strategic asset. As such, it needs to be managed and leveraged to support the organisation's business objectives. This project aims to develop a framework for the representation and management of enterprise system architectures. The framework provides the basis for an enterprise architecture repository, which is essential to facilitate architecture practice in large organisations. This project involves collaboration with the Australian Defence Science and Technology Organisation (DSTO), and Nanjing University of Aeronautics and Astronautics.

Enterprise System Integration and Evolution

J Han et al

This project continues from our research into enterprise system architectures, with a particular focus on leveraging enterprise system architectures in facilitating the integration and evolution of enterprise systems. Key issues addressed include enterprise system evolution scenarios, system interoperability analysis, and enterprise system architecture solutions. Results from these areas form the core of an automated environment/tool for enterprise integration and evolution.

Forms: A Formal Foundation for Software Composition

J-G Schneider et al

Component-oriented software is an increasingly accepted technology where applications are built as conglomerations of interacting software components. However, existing component models and environments do not fulfil all the needs of software developers, and the lack of an appropriate foundation for specifying the semantics of components and compositional abstractions has been identified as one of the main issues. In collaboration with the Department of Computer Science of Iowa State University, this project tackles this problem by defining a suitable formal foundation for software composition. In particular, we further develop the notion of forms, a special variant of immutable extensible records, and integrate forms into a process calculus. It is expected that the resulting formalism will have the required expressive power to solve the problems of adequately specifying the semantics of components and compositional abstractions.

A Framework for Data Flow Analysis of Object-Oriented Programs

A Cain, et al

Data flow analysis is a testing technique that locates anomalies in the use of programs variables. This analysis can be performed statically by examining the programs source code, or dynamically by running an instrumented version of the program. Historically, dynamic data flow analysis has been applied to procedural programming languages such as C, COBOL, and Pascal. Current approaches for testing object oriented programming languages have attempted to directly apply the procedural techniques with differing degrees of success. Our research looks at developing an object-oriented approach to performing dynamic data flow analysis for object-based systems with the aim of achieving a more natural solution. At this stage, we have developed a meta-model based approach to performing dynamic data flow analysis and have implemented a prototype model for Java. Currently, we are in the process of implementing prototype models for other object-oriented languages such as Smalltalk, CLOS, Python, C++, C#, and Visual Basic.NET.

Ontogenic Adaptation Using Role-Based Architecture

A Colman, J Han, L Johnston, K von Baggo

As modern computing environments become more open, distributed and pervasive, the software we build for those dynamic environments will need to become more adaptable and adaptive. This project is developing an object meta-model and software architecture based on the concept of ontogenic adaptation. The key to ontogenic adaptation is the maintenance of organisational integrity in the midst of structural change and component interchange. The meta-model facilitates the elaboration of organisational descriptions using different types of role. Management roles (control) and functional roles (process) are distinguished. An adaptive software architecture based on the loose-coupling and late-binding such roles and objects is being developed. Design and implementation language mechanisms supporting such an architecture are also being developed.

Performance Engineering for Component-Based Software

J Han, K K Ker et al

Performance is a key attribute of software systems, especially of real-time and embedded systems. As these systems are increasingly built from software components/packages, there is a great need in knowing the performance properties of the software components and being able to analyse the performance properties of the composite systems built using these components. This project aims to develop a model for (1) characterising the performance properties of software components from an interface perspective, and (2) analysing the performance properties of component-based software systems. The model forms the basis of performance interface specification for software components and that of performance analysis for component-based systems.

Security Engineering for Component-Based Software

J Han et al

Security is an important attribute of software systems, especially of open distributed software systems. As systems are increasingly assembled from software components/packages, there is an urgent need in being able to know the security properties of the software components and to deduce such properties of the composite systems assembled from these components. This project aims to develop a model for (1) characterising the security properties of software components from an interface perspective, and (2) analysing the security properties of component-based software systems. The model forms the basis of security interface specification for software components and that of security analysis for component-based systems.

Towards the Next Generation of Composition Languages

J-G Schneider et al

In recent years, component-oriented software technology has become the major approach to facilitate the development of evolving systems. However, experience has shown that existing component models and environments do not fulfil all the needs of open systems development as they generally only focus on specialized application domains, lack precise semantics for specifying components and compositional abstractions, and do not allow for automated verification of compositions. This project intends to address these problems by implementing a prototype of a next-generation composition environment with a special focus on customizable, higher-level composition and verification mechanisms. In this context, we also want to define a formal framework for addressing the inherent problem that, in the face of incomplete knowledge of the deployment environment, the correctness of a system of collaborative software components cannot be adequately verified.

Centre for Intelligent Agents and Multi-Agent Systems (CIAMAS)



Director: Professor Ryszard Kowalczyk

The aim of CIAMAS is to research and develop new methods, techniques and software solutions for Intelligent Agents and Multi-Agent Systems and their applications in complex real-world problems, focusing on autonomous decision-making, coordination and adaptation mechanisms for building and managing open large-scale distributed systems.

Prof Ryszard Kowalczyk (Director)

Projects

Agent-based Management of Service Oriented Environments

R Kowalczyk et al

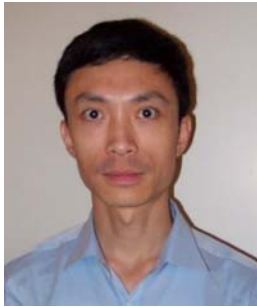
In this project, we explore new approaches for intelligent agent-based management of adaptive service provision processes in order to ensure collective Quality of Service (QoS) and stateful coordination of services in dynamic service oriented environments such as adaptive services grids and virtual organisations.

Agent-based Negotiation in Services Grids

R Kowalczyk et al

This research project investigates the state-of-the-art of agent-based negotiation in service grids. It has resulted in a new framework for Negotiation of Grid Service Agreements that has prototypically been implemented and demonstrated as a proof-of-concept for the selected scenarios of grid service composition.

Centre for Internet Computing and E-Commerce (CICEC)



Director: Associate Professor Yun Yang

CICEC performs innovative research into the development and application of Internet technology for Internet computing and electronic commerce. Our primary focus is to produce insights, frameworks, models and prototypes for software developers, information technologists, software, knowledge and information systems managers and Internet entrepreneurs. Our key strength is the ability to integrate our multi-disciplinary skills and expertise with a view towards solutions to contemporary business and technological challenges.

Peter Eden

Phil Freeman

Phil Joyce

Dr Wei Lai

Lukman Setiawan

Dr Jun Shen

Dr Baolin (Boris) Wu

Assoc Prof Yun Yang (Director)

Projects

Internet Based e-Business Ventures

CICEC Group Project

The specific areas of Internet based e-business venture research in CICEC that we wish to target under this strategic research initiative are summarised in the following.

- (1) Development of a suitable e-business modelling environment utilising the current and substantive knowledge and data of many e-business descriptions and models. This initiative will extend knowledge of the domain by advancing the analysis, modelling and classification of Internet based e-business ventures.
- (2) Visualisation and rendering of e-business models will be advanced by this work not only to enhance communication and comprehension of the models, but also to enable exciting possibilities in terms of simulation, feasibility testing and exploration of "what if" scenarios.
- (3) Development of a suitable wide area workflow framework as infrastructure support for e-business processes. This initiative will investigate seamless integration of portable data and tools, with visualised environments.

Supporting Business Processes with Peer-to-Peer Based Decentralised Workflow

Y Yang, G Raikundalia (Victoria University), J Yan, et al

It is recognised that effective business processes support can yield competitive advantages for business organisations. This project aims at investigating the technologies of supporting business processes, especially for small-and-medium enterprises (SMEs), with peer-to-peer based decentralised workflow. The research proposes an innovative workflow architecture to support SME's business processes better, which combines the concepts of workflow technology and peer-to-peer computing. Novel mechanisms to fulfil workflow functions in this decentralised workflow environment, including process specification, data storage, process execution, workflow adaptation and exception handling, are explored.

Workflow Verification

H Li, Y Yang, TY Chen, J Chen et al

A workflow specification contains information formally describing various aspects of a workflow. Building workflow specifications is a complex and error-prone process, especially for large-scale workflows. It is likely to introduce inconsistencies or errors in workflow specifications. Such inconsistencies or errors may lead to incorrect execution of some or all workflow cases. In this part, we aim at facilitating static and dynamic techniques to analyse various constraints within or between workflow specifications, as well as workflows.

Supporting Group Awareness in Real-Time Distributed Collaboration

Y Yang, G Raikundalia (Victoria University), M H Tran et al

Internet-based collaboration is of strategic importance and great benefit to Australia, with its population geographically dispersed over highly distant areas and the distance to the other parts of the world. Perceiving and understanding the activities, responsibilities of members of a collaborating ensemble is a basic requirement for group interaction. However, when group members are geographically distributed, supporting spontaneous interaction is much more difficult. This project investigates how to improve the usability of real-time groupware systems by supporting group awareness. The goal of this project is to exploit user-centred approach to form a framework for group awareness in real-time distributed collaboration. The framework can be used in a two phase approach: to understand conceptually the characteristics of group awareness, and to design smart usable awareness mechanisms to better facilitate group awareness.

Layout Adjustment and Navigation for Enterprise Geographical Information Systems

W Lai, D Yu et al

This project aims at developing a software prototype for conveniently navigating and viewing both geographic images and enterprise information together in helping big organisations to manage their geographic distributed branches. This is a collaborative research project with a software company – Hypersoft International (Australia). The research will develop effective interfaces for geographic image navigation, detailed local image/map viewing and enterprise information browsing. The leading high-tech software house, Hypersoft, will provide direct feedback of the requirement and market needs, and will subsequently integrate the research prototype to be a software product.

Adaptive Visualisation for Information Retrieval

W Lai, X Huang et al

Information retrieval usually compares a user query with target documents in a database or Web space to extract the information that exactly matches the user's query. However, in many cases, users may not be able to formulate the exact query, and often give an approximation at the beginning and then refine the query according to the initial results. Thus the amount of retrieved information might be very large, and may not be relevant to the final results. Using visual representations for the retrieved information enables users to understand retrieved data intuitively. Moreover, the visual representations can show the relationships between the query and the retrieved data, such as relativity between the retrieved data and the query can be expressed as a relative distance between them. This research will investigate visualization techniques, especially layout displays in the limited computer screen; visual reasoning and navigation for searching retrieved information. Adaptive techniques will also be investigated for automatic giving suitable visual visualizations for retrieved information based on the user's interests.

Designing Effective User Interfaces for Web Courseware

W Lai, J Tanaka (Tsukuba University) et al

Current courseware development has moved to integrate multimedia, the WWW and Internet techniques. We think that the courseware design should not only put teaching materials on the Web and integrate audio/video facilities, but also should focus on other issues, such as user interfaces and software architecture. Our approach is to adapt the general architecture for building a Web site to our courseware development by identifying the roles of system programmers, Web developers, and course designers. The user interfaces is the crucial part for a courseware system. This project aims at investigating effective user interfaces which can help students' learning. This is a joint research project with Professor Jiro Tanaka at the University of Tsukuba in Japan.

Evaluating Application Service Provision and Information Systems using System Dynamics Methodology

P Joyce, W Currie, G Winch

Despite the hype surrounding the value-added potential of e-business for contemporary firms, the technology downturn is marked by poor customer satisfaction from investment in e-business initiatives. An apparent mismatch between customer expectations and vendor offerings suggests a lack of appropriate methods and techniques for evaluating e-business. This project will examine the diversity of longitudinal research study on the deployment, hosting and integration of application service provisioning (ASP). A major element of this project is the examination of e-business models targeted mainly at small and medium enterprises (SMEs). Using system dynamics as a methodology we will examine the inherent complexity of the ASP model, the research demonstrates how a series of complex inter-relationships between key performance indicators (KPIs) will impact the business value for customers from ASP vendor products and services.

Codifying Business Models in e-Business Design

P Joyce, G Winch, W Currie

The development of business models for eBusiness has become increasingly popular within both the academic and business arena. We believe that many of the business models for eBusiness are static in nature and only provide a historical view. A major criticism of business models for eBusiness has been the lack of evaluation techniques for the models that have been generated. Many of these models are anecdotal or retrospective in nature. Moreover, there has been no evaluation of the taxonomies. Therefore, this project will re-examine the activities that form the basis for many of these models that are in the current. This re-examination can only be achieved by utilising innovative modelling approaches to gain a greater insight into the complexity of business models for eBusiness. In this project we will use systems dynamics as a methodology to show the complexity and develop new eBusiness models. In this research we draw upon the emergent knowledge of eBusiness together with the traditional strategy theory and developed business models for eBusiness for evaluation.

Supply Chain Management and Design in e-Business Design

P Joyce, G Winch, W Currie

Effective supply chain management is a growing object of modern manufacturing. Modern management are undertaking business process reengineering with the basic processes of their organizations and are drawing on information technology to solve the extremely complex problems. Moreover organizations are using technology as a major differentiator to gain a strategic advantage in the development of their products. However, the specification, implementation and development of suitable enterprise resources planning systems and their integration into manufacturing organizations is still an open question. A central pillar of the project is it brings together expertise from the technical and business perspectives. That is, this project examines many of the complex technical issues of managing, controlling, co-ordinating and supporting the business processes while also examining the business issues of analysing, modelling, classification of possible business ventures. Unlike any other systems in the world this project will allow for the simulation and testing of the possible supply chain possibilities.

Explaining the Success of CRM Packaged Software-Based Work Systems

P Freeman, P Seddon (University of Melbourne), R Scheepers (University of Melbourne)

Many billions of dollars have been invested in customer relationship management (CRM) packaged software. However, despite the large body of knowledge on IS project success factors and mechanisms for achieving benefits from packaged software, many CRM package software initiatives still fail to realise their intended benefits. This research project will explore the success and failure of CRM packaged software-based work systems and will attempt to answer the following research question: "Why do some organisations realise benefits from their investment in CRM packaged software-based work systems while others don't". The main contributions of this research project are to develop insights and strategies for IS practitioners on how to realise benefits from CRM packaged software-based work systems and to extend the current theory on IS success and benefits.

Centre for Intelligent Systems and Complex Processes (CISCP)



Director: Professor Tim Hendtlass

The Centre for Intelligent Systems and Complex Processes exists within the School of Information Technology and the School of Biophysical Sciences and Electrical Engineering. The Centre acts as a focus for, and promotes, research in areas such as artificial neural networks, evolutionary algorithms, collective intelligence algorithms, data visualization techniques, brain dynamics and brain modelling. Our aim is to develop a world-class reputation for our work in intelligent systems and complex processes and for the quality of the training we give our students. Our key strengths lie in the diverse backgrounds and experience of the personnel and the collegial nature of our research activities.

Dr Kevin Bluff

Dr Ingo Bojak *

Prof Tim Hendtlass (Director)

Dr Rom Jagielski

Dr David Liley* (Deputy Director)

Assoc Prof Marcus Randall (Bond

University) Clinton Woodward

* based in School of Biophysical Science and Electrical Engineering (BSEE)

Projects

(Only those undertaken within the School of Information Technology are listed)

The Evolution of Cooperative Behaviour Amongst Independent Robots

K Foster

A mobile robot control system has been developed that enables a robot to create rules for future decisions based upon previous experience. The control system is a rule-based expert system. Machine learning methods are used to enable the robot to independently develop one rule at a time to incrementally grow a set of rules. The control system will also be used to investigate cooperative behaviour amongst multiple mobile robots. Experiments are conducted with one or more simulated robots in various simulated environments.

Ant Colony Optimisation Techniques

T Hendtlass, M Randall (Bond University), J Montgomery (Bond University)

Ant Colony Optimisation draws on the way that ants locate good if not optimum paths, particularly through the use of pheromone, and applied it to constructive optimisation problems. The work undertaken here considers the correct form that the pheromone should take for various types of problems and how the quality of the solutions generated can be enhanced by providing the artificial ants with a memory.

Advanced Particle Swarm Optimisation

T Hendtlass

Particle swarm optimisation is an algorithm based generally on the swarming behaviour of birds and insects. Each individual in the swarm continues along its chosen path, but is influenced by cues about how well the others in its neighbourhood are doing as well as where in the swarm things seem to be best. A conventional particle swarm algorithm balances just those factors but is never the less able to optimise a search and find, if not absolutely the absolutely best point to be, a very good place to be. This has allowed it to be used to optimise a large number of both real and artificial situations.

The advanced swarm algorithm under development provides each member of the swarm with an independent memory that can also influence its subsequent movement. This has already been showed to increase the overall swarm performance at a number of tasks. It also allows multiple swarms to exist with occasional exchanges of information between members of the different swarms. This further lifts performance.

Minimisation of Geometric Errors of a Robot Manipulator using Methods Computational Intelligence

R Jagielski and A Sekercioglu (Monash University)

This project involves developing optimisation algorithms based on computational intelligence methods for the purpose of improving self-calibration of robot manipulators using minimum experimental data. The error estimation functions are determined from the robot position data provided by a high precision laser measurement system. These functions are derived from Particle Swarm Optimisation (PSO) algorithms and are verified for a test trajectory, which contains various configurations of the manipulator. The experimental results demonstrate that the positioning errors of robot manipulators can be effectively predicted with PSO allowing significant positioning error compensation.

The Parallel Path Artificial Neuron and Its Applications

G Murray, T Hendtlass, Dr J Podlena

Conventional artificial neural networks can build a model of a data set, based on the distribution of the data, through the statistical process of regression. Although the formal layered structure of these neural networks and the components used to construct them have essentially remained unchanged for decades this type of artificial neural networks (ANN) have been successfully used for a large number of tasks. However, the formality of such layered architecture imposes certain restrictions on the successful utility of these networks.

For some tasks the standard paradigm of an “artificial neuron” may not contain the complexity required to solve these more complex problems. The aim of this project is to introduce additional complexity by incorporating a more intricate scheme of interconnection, thereby providing the ANN with the ability to generate higher-order representations of the inputs.

The results from this project have yielded a new feed forward paradigm, and modifications to a conventional training regimen to facilitate learning, as well as novel analysis techniques to assess the quality of the data model in real time.

Application of Reincarnation in Artificial Intelligence

B Prime

The Evolutionary Algorithm (EA) has been shown to be a fairly robust optimisation technique for multi-dimensional problems in both practical and theoretical realms. In general terms the EA is a way of searching through the “problem space” of possible solutions, in such a way as to be likely to find a good (sometimes optimal) answer without having to evaluate every possibility. EA’s apply the principle of “survival of the fittest” to evolve an artificial population of randomly initialised potential answers towards what is hopefully an optimal outcome. The population searches through problem space by means of the recombination and mutation of information contained in each member of the populous to form subsequent generations.

The EA can be better than exhaustive search techniques in that it takes less time to find a solution. The speed that makes the EA so attractive, however, can come at the price of producing a final solution that is not the global best. This is known as “premature convergence”.

The idea of reincarnation has existed for a long time. We are investigating the application of reincarnation to evolutionary algorithms. It is hoped that the technique can improve the solutions by shortening search time and decreasing the probability of premature convergence.

It is the goal of this research to explore the benefits and shortfalls of the introduction of various schemes of recycling old genetic material.

Artificial Intelligence Architectures for Classifying Conjoint Data

H Pierrot

Conjoint data is data in which the classes abut but do not overlap. As there are no inherent clusters in conjoint data it is difficult to determine the boundaries between the classes and traditional classification methods, such as counter propagation networks and standard classifier systems, under perform. The aim of the project is to develop new algorithms to correctly classify conjoint data example, a task complicated by the fact that there may only be one point that distinguishes two classifications.

Enhanced versions of the counter propagation artificial neural network and to a standard classifier system have been developed that shows a significant performance increase over conventional approaches.

A Hybrid Particle Swarm and Ant Colony Algorithm for Machine Scheduling

C Taylor, T Hendtlass

This work considers factory production which can be modelled as a set of jobs that need to be completed. Each job requires one or more operations, and each of these operations may be performed on one of a set of suitable machines. For example, the production of a cardboard box (a job) may involve three operations: cutting (on one of 3 cutting machines), folding (on one of 2 folding machines) and painting (on one of 4 painting machines). If there are many jobs that need to be produced then the efficient scheduling of the operations becomes an important and non-trivial task. The scheduling involves two tasks, a routing task (deciding which machine to use for each operation on each job) and a sequencing task (choosing the order of the operations on each machine.) Failing to optimise either of these tasks can cause unnecessary bottlenecks and degrade the performance of the factory.

In this project the approach taken involves the use of a particle swarm optimisation (PSO) algorithm to solve the sequencing task and an ant colony optimisation (ACO) algorithm for routing. ACO and PSO are problem-solving paradigms inspired by nature.

Application of Dynamic Selection of Gene Expression within Multiploid Structures to Evolutionary Algorithms

C Woodward, Dr H Copland

Evolutionary algorithms are a method of solving problems that use populations of individual solutions and breed new solutions from the good individuals. Successive generations of simulated evolution will typically produce a very good solution from the problem space. The pieces of information within an individual are contained in a structure typically called a chromosome, and each piece is usually called a gene. A multiploid structure is a term used to represent two or more sets of chromosome information within the one individual. The selection or 'expression' of which genes from which chromosomes are used for the solution attempt is a major component of this investigation. Initially, simple neural networks are being used as a selection mechanism. These have been labelled NEDI's for Network Expressed Diploid Individuals. Other methods for selection such as dominant/recessive tables, masks, swam searches and fractal selection are also being investigated.

Centre for Molecular Simulation (CMS)



Director: Professor Richard Sadus

The aim of CMS is to significantly advance scientific knowledge of intermolecular interactions, properties and processes.

Dr Matthew Downton

Mr Nader Kidwani

Dr Ming Liu

Prof Richard Sadus (Director)

Assoc Prof Billy Todd (Deputy Director)

Dr Feng Wang

Dr Guangwen Wu

Dr Zhongwu Zhou

Projects

Nanotechnology Initiative

M S Liu, M T Downton, B D Todd, R J Sadus

We are interested in using molecular simulation and other computational techniques to gain theoretical insights into how nanosystems work. For example we are currently working on the simulation of a particular type of biomolecular rotary motor, ATP-ase. This biological molecule acts both as a proton pump (pumping H⁺ ions between different parts of a cell, thus moderating intracellular PH levels), as well as having the remarkable ability to move in a direction perpendicular to the axis of rotation (akin to the motion of a helicopter). The mechanisms of this behaviour are currently being examined with the aim of developing a model to account for the translational motion of the motor. This could potentially be a very useful application in molecular medicine.

The Study of Intermolecular Interactions

G-W Wu, R J Sadus

The Gibbs Ensemble Monte Carlo algorithm has been implemented for the prediction of phase equilibria in multiphase and multicomponent fluids. Historically, the prediction of both vapour-liquid and liquid-liquid equilibria has relied almost exclusively on approximate theoretical models or on empirical equations of state rather than on rigorous models for intermolecular interaction at high fluid densities. The advent of new computer simulation techniques provides an opportunity to apply directly our knowledge of intermolecular potentials to the prediction of fluid phase equilibria. This work has several strands:

- Investigation of three-body interactions in pure fluids. This work has found that three-body repulsion has an important role in determining phase vapour-liquid transitions.
- The role of three-body interactions on vapour-liquid and liquid-liquid equilibria in binary mixtures.

- Simulation of membrane equilibria.
- Simulation of flexible hard-sphere chains and ionic systems.
- High-pressure liquid-liquid phase equilibria.

Nonequilibrium Molecular Dynamics and Transport Properties of Fluids

T Hunt, J Ge, B D Todd, J Zhang, Z Zhou, R J Sadus

While thermodynamics traditionally deals with systems that are at equilibrium, most natural systems are actually far from equilibrium and are either evolving with time, or exist in a time-independent steady state. One can study such systems at the microscopic level by applying the principles of nonequilibrium statistical mechanics to molecular dynamics simulations. Some of the work we are currently interested in includes:

- Development of new algorithms for simulating simple and complex fluids far from equilibrium.
- Molecular rheology of polymer melts.
- Transport properties of bulk and microscopically confined fluids.
- Relationship between microscopic dynamics and irreversible thermodynamics.

Electron Momentum Spectroscopic Studies of Organic Species

K L Nixon, M J Brunger (Flinders University), F Wang and D A Winkler (Molecular Science, CSIRO)

This project is a continuation of the long term collaboration between Dr F Wang, A/Prof M J Brunger and Prof D A Winkler of CSIRO. This multidisciplinary project combines experimental electron momentum spectroscopy (EMS) at the Brunger group of Flinders University with the theoretical expertise of Dr Wang and Prof Winkler to study organic molecules of special structures. This project enables us to use experimentally validated quantum mechanical models to study chemical bonding mechanisms of these molecular with unusual binding nature. This collaboration has been successful on the ARC DP (2004-2006) for the recognition of the expertise in both theory and experiment.

Dual Space Analysis of Molecules Probed by Electron Momentum Spectroscopy

W N Pang (Tsinghua University, China) and F Wang

Dual space analysis was introduced by Dr Wang in 2003 from her many years of collaboration with Australian's leading electron momentum spectroscopy (EMS) group of Flinders University. Since 2003, A/Professor W N Pang and Dr F Wang have worked together to tackle chemical bonding mechanism issues of conformational isomers such as n-butane. The collaboration is consolidating to combine Prof Pang's experimental expertise and Dr Wang's theoretical strength. The project is in a move to measure the predicable properties and also to predict the measurable properties of molecules.

Interface Development for Molecular Modeling Applications

C Sukumalchantr, M Hamilton (RMIT) and F Wang

In this joint project with School of Computer Science and Information Technology, RMIT, we are developing momentum space quantum chemistry related software and interfaces to meet the research needs. Under the supervision of Dr Hamilton of RMIT and Dr Wang, Ms Sukumalchantr has successfully developed working interface using C++ to interface information from coordinate space to momentum space. Her M Sc degree was successfully completed in 2003 (RMIT) with her thesis externally examined.

Novel Molecular Properties Studied using DSA

N Kidwani and F Wang

Funded by the School Research committee on the base of new academic staff initiative program (to Dr Wang), N Kidwani worked on a part-time base (0.2) for the project of novel molecular properties studied using DSA introduced by Wang. The information of molecular properties and structures in coordinate space is well known by chemists. However, anisotropic properties of molecules such as energy degenerate states and near-degenerate states, the shape and space factor of chemical bonding mechanism and orbitals are still challenges for quantum chemistry and many energy dominant experiments. Momentum space information, through a Fourier transform, provides an addition dimension of information to gain insight understanding of these properties.

DFT Studies for Small Molecules-Metal Surface Adsorption

D P Chong (University of British Columbia) and F Wang

Professor D P Chong is a world leading Canadian researcher in density functional theory (DFT). He is well connected worldwide and has collaborations with another world leading EMS group at the University of British Columbia (Canada). Density functional theory is one of the most important quantum mechanical methods in chemistry, biochemistry and materials science etc. However, one of the significant drawbacks of DFT is that the energetic properties, such as binding energies can not be simply approximated as the negative of the orbital energies in the one-particle picture using the Koopman Theorem. Chong's group has successfully developed DFT related method to accurately calculated binding energies of molecules in both core and valence shells of molecules and solids. The collaboration in this project will provide the complementary theoretical expertise of both groups. This project will be enhanced at Prof Chong's visit in Oct/Nov 2004.

Interpreting EMS using DFT and Geen's Function Theory

M S Delueze (Universitair Centrum, Belgium), M J Brunger (Flinders University) and F Wang

Electron momentum spectroscopy is particularly loved by quantum chemists as it probed both binding energies and orbital wavefunctions (squared in momentum space) simultaneously, which is the heart and soul of quantum chemistry. It had been evident that the Dyson orbitals detected by EMS are the Kohn-Sham orbitals calculated using DFT. However, it is quite difficult for DFT to generate reliable binding energies of the same molecule as measured by the EMS binding energy spectrum. As a result, Green's function theory has its unique power to generate CI-quality binding energy spectra of molecules. Naturally, the three groups which have complementary expertise in EMS experiment (Brunger), DFT and EMS simulation (Wang) and Green's function and quantum chemistry (Delueze) started to collaborate. The collaboration was initiated by Prof Deleuze's visit to Swinburne and Flinders University in Nov 2003.

Studies for Two-Body Potential Energy Surfaces

L Gross (University of Queensland) and F Wang

Since Morse (1935), the potential energy surfaces of even two-body interactions have been still the target of chemists for generations, due to their paramount importance in molecules, clusters and materials. Recently, after many years research in potential energy surfaces and functions, as well as the determination of molecular properties of spectroscopic accuracy, Wang discovered some unique

mathematical properties of the two-body binding potentials. In this project, we combine A/Prof Gross's expertise in mathematical and computer science with Wang's expertise in chemical bonding and potential energy surface, to explore the insight understanding of potential energy function properties.

Information Visualisation in 3D

P Burke and F Wang

Information visualization and three-dimensional (3D) visualization is an important component in quantum mechanics and large biological molecules such as protein. In this project, we proposed to develop visualization tools particularly for the Swinburne University Virtual Reality (VR) facilities. Equipped by the state-of-the-art facilities, we will be in a good position to tackle biological molecules and their structures such as proteins and drug candidates. Mr Burke is a 3D specialist in the Centre for Astrophysics and Supercomputing, Swinburne University.

Centre for Software Engineering (CSE)



Director: Professor TY Chen

The mission of the Centre for Software Engineering is to promote pure and applied research in software engineering and to become a leading research centre in software engineering.

Dr Rob Allen	Dr Edmonds M F Lau
Andrew Cain	Dr Sebastian Ng
Prof T Y Chen (Director)	Dr Jean-Guy Schneider
Prof Doug Grant	Dr Jim Sykes
Barbara Hurst	Barry Tyrer
Dr Lorraine Johnston	Rajesh Vasa
Dr Wei Lai	

Projects

Fault-based Software Testing Strategies for Logical Expressions

T Y Chen, E Lau, et al

Logical expressions are frequently found in predicates inside programs, as well as in software specifications, to describe the complex conditions for a segment of program codes to be executed or for a particular function of a program to be performed. Existing software testing strategies for logical expressions either lack solid theoretical foundations, or require a large test set, or are limited in the types of faults that they guarantee to detect. This project aims at improving the cost-effectiveness of existing software testing strategies, and extending the theoretical foundations of the previous work by us and others.

A Fuzzy Approach to Software Testing

T Y Chen et al

In this project, we apply the technique of fuzzy set to investigate the classifications of failure patterns. We also investigate the relationships between failure patterns and the effectiveness of various testing strategies.

Random Testing

T Y Chen, K C Kuo, R Merkel, S Ng

In this project, we investigate how to improve the fault detection capabilities of random testing.

Deriving Test Cases from Program Specifications

T Y Chen et al

In this project, we investigate how to derive test cases from specifications. We are particularly interested in the test case generation techniques that are applicable to informal specifications.

Data Flow Analysis for Java Programs

A Cain, T Y Chen, D Grant

In this project, we investigate how to use the technique of data flow analysis to identify questionable coding in Java programs. The technique of program instrumentation is used to implement a dynamic data flow analysis system for Java programs.

Towards Automatic Diagram Layout and Efficient Code Generation for Software Development

W Lai et al

Current CASE (Computer Aided Software Engineering) tools use diagrams to express object models for software design and development. They provide interactive graphical editors for software design modelling, and generate program header files from diagrams. However their graphical editors do not support automatic diagram layout and their code generation approach is generally less than optimal. This project will investigate these problems, to enable improvements in the next generation of CASE tools. This research will provide the theoretical foundations for the incorporation of improved CASE tool features.

Information Technology Innovation Group (ITIG)



Director: Kon Mouzakis

ITIG is an emerging group of national significance that focuses on providing high quality research and development services to the information technology industry. ITIG provides innovative and state-of-the-art computing solutions to industry problems specializing in the areas of mobile and pen-based computing, web-based technologies, and distortion-based visualization techniques. ITIG capitalises on its relationships with industry by complementing all development activities with parallel research-based programs.

Patrick FitzGerald
Winston Fletcher
Euan Grant
Kon Mouzakis (Director)

John Newbigin
Chris Pilgrim
Dr Karola von Baggo

Projects

Portable Data Recorder (PDR)

ITIG Group

In 2000, DSTO commissioned ITIG with the goal of developing a generic data collection tool. The system that was developed by ITIG allowed a range of assessment data to be collected recording GPS locations and timestamps of all user interactions, allowing DSTO to cross-reference data collection with geographical locations over time. The PDR also allows the recording of audio and electronic ink annotations, which may be associated with assessment items. This project involved several refinements to the PDR system.

Behavioural Data Analysis of Seahawk Helicopters DSTO AOD Melbourne

ITIG Group

This project is the first stage of the development of software to automate behavioural data analysis. The project involved the development of two different approaches which apply a rule set to behavioural data which categorised and quantified all behaviours from input data. The two approaches involved the use of a higher level procedural programming language and a logic based language. This first stage included a comparison of the two approaches.

Study of HCI Issues for Project Wundarra DSTO LOD Adelaide

ITIG Group

This Research Agreement (RA) is intended to support the program of research into mobile computing currently underway at Swinburne University of Technology. A particular focus of the research being carried out at Swinburne is the issue of usability of different HCI option for Mobile Computing Devices.

Pointing Accuracy on Pen-Based Mobile Computing Devices While on the Move

K Mouzakis

The aim of this study is to investigate the characteristics of pointing movements on a Personal Data Assistant (PDA) while the user is on the move. In particular, it is concerned with whether the relationship between movement difficulty and movement speed (ie, Fitts Law) changes as the mobile environment is changed from standing still to walking. This information will assist in the development of interface design guidelines which will make PDA software applications easier to use.

Swinburne Computer-Human Interaction Laboratory (SCHIL)



Director: Dr Lorraine Johnston

The SCHIL Research Group focuses on issues of human-computer interaction (HCI) and ways of supporting user tasks. In SCHIL's state-of-the-art usability laboratory we study better ways of making user-centred systems and devices. The range of research activities is quite broad, and encompasses areas as diverse as trust in e-commerce, the use of hand-held devices in the healthcare industry, usability of e-learning environments and mobile devices, and accessibility issues for software users. We also study software development concerns such as affective factors in software, usability patterns, and user-centred process models for software engineering.

Liz Burley
Oliver Burmeister
John Craick
Graham Farrell
Vivian Farrell
Toby Hede
Dr Peter Higgins

Barbara Hurst
Dr Lorraine Johnston (Director)
Catherine Lang
Kon Mouzakis
Barry Tyrer
Dr Karola von Baggo

Projects

Beyond Efficiency and Effectiveness: Evaluating Technologies that Aim to Convey an Experience

T Bentley, L Johnston and K von Baggo

In the past it was adequate to evaluate technologies according to how well and how quickly they support a task being executed. However it is becoming evident that usability evaluation methods based on the measures of efficiency and effectiveness are inadequate in some circumstances. Many current technologies attempt to convey a user experience, whether it be fun, motivating, entertaining, rewarding or satisfying. At present, we lack the formal methods to evaluate user experience goals in such technologies. The aim of this research is to provide the groundwork for the generation of methods that can be applied to evaluate 'user experience', by

- attempting to identify the major user experience goals in one example of these technologies (ie computer games), as perceived by users and developers, and
- investigating how the user experience can be evaluated in a more formal way.

We are currently examining whether biophysical techniques may be useful in identifying when a user experiences a range of emotions while playing a computer game.

Accessibility

O Burmeister

This spans collaborative projects with industry partners including one on investigating means that will help developers convince management of the importance of considering accessibility issues in project planning. This project has to do with ethical considerations in HCI, and involves social responsibility issues, such as the need to consider accessibility issues in software design. Another project seeks to document how to do web-based accessibility evaluations.

Models for Incorporating User Concerns into the Software Development Process

L Johnston

Software developers tend to focus on the more tangible attributes of software like performance and functional requirements. Often, there is little thought given to the users of the system, and to their needs. Conversely, user interface specialists often focus only on the user and their environment, and come up with a solution that cannot be supported technically. What is needed is a process model that takes the best of both worlds, and assists developers to produce a usable product. This project is investigating ways of doing this.

Usability Patterns in Practice

L Johnston

Software developers commonly refer to well-known patterns of object-oriented code. More recently, researchers have noted that there are also common solutions to usability problems that are used in a variety of applications. This project is to investigate whether usability patterns are helpful to designers in practice, and validation is being carried out in the banking industry.

Building Trust in e-Commerce

V Farrell

Models of trust have been proposed by numerous people from both marketing and technical perspectives. However, neither group seems to acknowledge the presence of the other group. This project seeks to build a unified model, and then to investigate how a user develops this trust in an e-commerce system. Conversely, what are the processes through which this trust will be destroyed?

Usability of Web Banking Facilities

J Craick

This project involves a practical examination of the usability of competing banking sites, focussing mainly on the factors that will encourage users to decide to move from straightforward day-to-day activities to higher-value activities such as online home loan applications.

Direct Manipulation and Call Handling Tasks on Mobile Phones

K von Baggo

Today's telecommunications industry now offers consumers a bewildering array of complex functionality designed to assist them communicate across both time and space. However, many of the more complex

call handling functionalities such as conference calling appear to be underutilised. One possible reason for this is usability problems associated with the limited interaction styles supported by traditional fixed and mobile telephony hardware. Recent developments in hardware have seen touch screen technology being implemented in mobile phones. This has allowed the use of direct manipulation interaction styles such as drag and drop. The aim of this project is to explore methods of representing and manipulating call handling tasks using direct manipulation techniques which have had demonstrated usability benefits for novice and occasional users in other application domains.

Refereed Publications

Book Chapter

- Chen, T. Y., I. Rahwan and Y. Yang (2003). Temporal interaction diagrams for multi-process environments. Practicing Software Engineering in the 21st Century. J. Peckham and S. J. Lloyd. Hershey, IRM Press: 143-156.
- Lai, W., P. Eades and M. L. Huang (2003). Flowchart components for program visualization. Software Visualization: From Theory to Practice. K. Zhang. Boston, Kluwer Academic Publishers: 59-75.
- Sykes, J. A. (2003). Negotiating early reuse of components - a model-based analysis. UML and the Unified Process. L. Favre. Hershey, IRM Press: 66-79.

Journal

- Arch, A. M. J. and O. K. Burmeister (2003). "Australian experiences with accessibility policies post the Sydney Olympic Games." Information Technology and Disabilities IX(2).
- Burley, L. and H. Scheepers (2003). "Emerging trends in mobile technology development: from healthcare professional to system developer." International Journal of Healthcare Technology and Management 5(3/4/5): 179-193.
- Chen, T. Y. and M. F. Lau (2003). "On the divide-and-conquer approach towards test suite reduction." Information Sciences 152: 89-119.
- Chen, T. Y., P.-L. Poon and T. H. Tse (2003). "A choice relation framework for supporting category-partition test case generation." IEEE Transactions on Software Engineering 29(7): 577-593.
- Chen, T. Y., T. H. Tse and Z. Q. Zhou (2003). "Fault-based testing without the need of oracles." Information and Software Technology 45: 1-9.
- Daivis, P. J., M. L. Matin and B. D. Todd (2003). "Nonlinear shear and elongational rheology of model polymer melts by non-equilibrium molecular dynamics." Journal of Non-Newtonian Fluid Mechanics 111: 1-18.
- Ge, J., B. D. Todd, G. Wu and R. J. Sadus (2003). "Scaling behavior for the pressure and energy of shearing fluids." Physical Review E 67(6): 0612011-0612013.
- Ge, J., G.-W. Wu, B. D. Todd and R. J. Sadus (2003). "Equilibrium and nonequilibrium molecular dynamics methods for determining solid-liquid phase coexistence at equilibrium." Journal of Chemical Physics 119(21): 11017-11023.
- Glass, R. L. and T. Y. Chen (2003). "An assessment of systems and software engineering scholars and institutions (1998-2002)." The Journal of Systems and Software 68: 77-84.
- Huang, M. L., P. Eades and W. Lai (2003). "On-line visualization and navigation of the global web structure." International Journal of Software Engineering and Knowledge Engineering 13(1): 27-52.
- Hunt, T. A. and B. D. Todd (2003). "On the Arnold cat map and periodic boundary conditions for planar elongational flow." Molecular Physics 101(23-24): 3445-3454.
- Joyce, P., R. Smith and K. Hodges (2003). "Information systems development contracts: an exploratory study of Australian legal practitioners' and information systems professionals' perceptions." Australian Journal of Information systems 10(2): 60-69.
- Kowalczyk, R., P. Braun, I. Mueller, W. Rossak, B. Franczyk and A. Speck (2003). "Deploying mobile and intelligent agents in interconnected e-marketplaces." Journal of Integrated Design and Process Science 7(3): 109-123.
- Lai, W., D.-g. Yu and Y.-I. Zhong (2003). "Dynamic layout adjustment and navigation for enterprise GIS based on object mark recognition." Chinese Geographical Science 13(1): 73-78.

- Lang, C. (2003). "Gender and the geek factor: why don't women do IT." Traffic: An Interdisciplinary Postgraduate Journal(3): 79-92.
- Liu, M. S., B. D. Todd and R. J. Sadus (2003). "Kinetics and chemomechanical properties of the F1-ATPase molecular motor." Journal of Chemical Physics **118**(21): 9890-9898.
- Matin, M. L., P. J. Davis and B. D. Todd (2003). "Cell neighbor list method for planar elongational flow: rheology of a diatomic fluid." Computer Physics Communications **151**: 35-46.
- Naikar, N., B. Pearce, D. Drumm and P. M. Sanderson (2003). "Designing teams for first-of-a-kind, complex systems using the initial phases of cognitive work analysis: case study." Human Factors **45**(2): 202-217.
- Nixon, K. L., F. Wang, L. Campbell, T. Maddern, D. A. Winkler, R. Gleiter, P. Loeb, E. Weigold and M. J. Brunger (2003). "An electron momentum spectroscopy and density functional theory study of the outer valence electronic structure of stella-2,6-dione." Journal of Physics B: Atomic, Molecular and Optical Physics **36**: 3155-3171.
- Raabe, G. and R. J. Sadus (2003). "Molecular simulation of the vapor-liquid coexistence of mercury." Journal of Chemical Physics **119**(13): 6691-6697.
- Sadus, R. J. (2003). "New Dieterici-type equations of state for fluid phase equilibria." Fluid Phase Equilibria **212**: 31-39.
- Salami, M. and T. Hendtlass (2003). "A fast evaluation strategy for evolutionary algorithms." Applied Soft Computing Journal **2**(3): 156-173.
- Simpson, C. R., L. Nevile and O. K. Burmeister (2003). "Doing ethics: a universal technique in an accessibility context." Australian Journal of Information Systems **10**(2): 127-133.
- Wang, F. (2003). "Assessment of quantum mechanical models based on resolved orbital momentum distributions of *n*-butane in the outer valence shell." Journal of Physical Chemistry A **107**: 10199-10207.
- Wang, F. (2003). "The invariant character of two-body binding potentials." Journal of Molecular Structure (Theochem) **664-665**: 83-89.
- Wang, F., M. J. Brunger, I. E. McCarthy and D. A. Winkler (2003). "Exploring the electronic structure of 2,6-stelladione from momentum space I: the p-dominant molecular orbitals in the outer valence shell." Chemical Physics Letters **382**: 217-225.
- Wang, J.-L. and R. J. Sadus (2003). "Global phase diagram for anisotropic binary fluid mixtures: reverse type IV behaviour." Molecular Physics **101**(14): 2211-2217.
- Wang, J.-L. and R. J. Sadus (2003). "Phase behaviour of binary fluid mixtures: a global phase diagram solely in terms of pure component properties." Fluid Phase Equilibria **214**: 67-78.
- Weckert, J. and O. K. Burmeister (2003). "Applying the new software engineering code of ethics to usability engineering: a study of four cases." Journal of Information, Communication and Ethics in Society **1**(3): 119-132.
- Yong, J. and Y. Yang (2003). "Fostering E-commerce among Australian SMEs." IEEE IT Professional **5**(5): 21-24.
- Yong, J., Y. Yang and J. Yan (2003). "Building ontology repositories for e-commerce systems." WSEAS Transactions on Systems **2**(2): 241-245.

Conference

- Alici, G., A. Sekercioglu, R. Jagielski and B. Shirinzadeh (2003). Prediction of geometric errors of a robot manipulator with particle swarm optimisation. 10th IEEE International Conference on Mechatronics and Machine Vision in Practice, 2003, Perth, Australia, City University of Hong Kong.

- Bai, C., K.-Y. Cai and T. Y. Chen (2003). An efficient defect estimation method for software defect curves. 27th Annual International computer Software and Applications Conference (COMPSAC 2003), Dallas, Texas, IEEE Computer Society.
- Bentley, T., L. Johnston and K. von Baggo (2003). Affect: physiological responses during computer use. OzCHI 2003: New directions in interaction, information environments, media and technology, Brisbane, Australia, University of Queensland.
- Burden, D., P. Joyce and J. Mustard (2002). Traditional Australian media organisations adoption of the World Wide Web. IFIP TC8 / WG8.4 Second Working Conference on E-Business: Multidisciplinary Research and Practice, Copenhagen, Denmark, Kluwer Academic Publishers.
- Baillie, C., Burmeister, O.K. and Hamlyn-Harris, J. H. (2003) Web-based Teaching: Communicating Technical Diagrams with the Vision Impaired, Proceedings OZeWAI2003, Australian Web Accessibility Initiative conference, La Trobe University, Dec.
- Cain, A., T. Y. Chen, D. Grant, S.-F. Tang, P.-L. Poon and T. H. Tse (2003). ADDICT: a prototype system for automated test data generation using the integrated classification-tree methodology. 1st ACIS International conference on Software Engineering Research and Applications (SERA '03), San Francisco, USA, International Association for computer and Information Science (ACIS).
- Cain, A., J.-G. Schneider, D. Grant and T. Y. Chen (2003). Runtime data analysis for Java programs. Advancing the State-of-the-Art in Runtime Inspection, Darmstadt, Germany, ECOOP.
- Chan, K. P., T. Y. Chen and D. Towey (2003). Normalized restricted random testing. 8th Ada-Europe International Conference on Reliable Software Technologies, Toulouse, France, Springer.
- Chen, T. Y., D. D. Grant, M. F. Lau, S. Ng and V. R. Vasa (2003). BEAT: Boolean Expression fAult-based Test case generator. International Conference on Information Technology: Research and Education (ITRE2003), Newark, USA, IEEE Communications Society.
- Chen, T. Y., F.-C. Kuo, R. Merkel and S. Ng (2003). Mirror adaptive random testing. Third International Conference on Quality Software QSIC 2003, Dallas, Texas, USA, IEEE Computer society.
- Farrell, G. and Y. Leung (2002). Designing an online self-assessment tool utilizing confidence measurement. IFIP TC8 / WG8.4 Second Working Conference on E-Business: Multidisciplinary Research and Practice, Copenhagen, Denmark, Kluwer Academic Publishers.
- Farrell, V., R. Scheepers and P. Joyce (2002). Models of trust in business-to-consumer electronic commerce: a review of multi-disciplinary approaches. IFIP TC8 / WG8.4 Second Working Conference on E-Business: Multidisciplinary Research and Practice, Copenhagen, Denmark, Kluwer Academic Publishers.
- Fellah, A., I. Rahwan and A. Maamir (2001). Information flow control using version in object-oriented systems. 15th annual international High Performance Computing Systems and Applications Symposium, HPCS 2001, Windsor, Canada, Kluwer Academic Publishers.
- Han, J. and K. K. Ker (2003). Ensuring compatible interactions within component-based software systems. Tenth Asia-Pacific Software Engineering Conference (APSEC2003), Chiang Mai, Thailand, IEEE Computer Society.
- Hendtlass, T. (2003). Preserving diversity in particle swarm optimisation. 16th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, IEA/AIE 2003, Loughborough, UK, Springer.
- Huang, X. and W. Lai (2003). Automatic abstraction of graphs based on node similarity for graph visualization. 15th International Conference on Software Engineering and Knowledge Engineering, San Francisco, USA, Knowledge Systems Institute.
- Huang, X. and W. Lai (2003). Force-transfer: a new approach to removing overlapping nodes in graph layout. Twenty-sixth Australasian Computer Science Conference, Adelaide, Australia, Australian Computer Society Inc.
- Huang, X. and W. Lai (2003). Identifying clusters in the web graph by using local search. International Conference on Internet Computing, Las Vegas, USA, CSREA Press.

- Huang, X. and W. Lai (2003). NodeRank: a new structure based approach to information filtering. The International Conference on Internet Computing, Las Vegas, USA, CSREA Press.
- Jagielski, R. (2002). Genetic algorithms with adaptive meta-heuristics for 2D packing problem. Sixth International Conference on Neural Networks and Soft Computing, Zakopane, Poland, Physica-Verlag.
- Joyce, P. and G. Winch (2003). Thoughts on codifying business models and process models in e-business design. 4th International We-B Conference (Working with E-Business), Perth, Australia, Edith Cowan University.
- Joyce, P. (2003). An Australian exploratory investigation into managerial perceptions of electronic commerce in the building industry of Victoria. 8th Collaborative Electronic Commerce Technology and Research Conference: COLLECTeR (Europe), Galway, Ireland, National University of Ireland.
- Joyce, P. (2003). Perceptions of the Australian government electronic services delivery in the Australian textile clothing and footwear industry. 3rd European Conference on e-Government, Dublin, Ireland, Trinity College Dublin.
- Khan, K. M. and J. Han (2003). A security characterisation framework for trustworthy component based software systems. 27th Annual International Computer Software and Applications Conference (COMPSAC 2003), Dallas, Texas, IEEE Computer Society.
- Kowalczyk, R. and V. Phiong (2003). Towards supporting collaborative scheduling in adaptive supply networks with intelligent agents. The 2003 International Conference on Management of e-Commerce and e-Government, Nanchang, China, Jiangzi Science and Technology Press.
- Lang, C. (2003). Flaws and gaps in the women in computing literature. The 2003 Australian Women in IT Conference (AusWIT 2003), Hobart, Australia, University of Tasmania.
- Lau, M. F., T. Y. Chen and S. Ng (2003). Fault detecting capability and test suite reduction for Boolean specifications: an empirical evaluation. 1st ACIS International conference on Software Engineering Research and Applications (SERA '03), San Francisco, USA, International Association for Computer and Information Science (ACIS).
- Li, H., Y. Yang and M. Shi (2003). Key issues and experiences in development of distributed workflow management systems. 5th Asia-Pacific Web conference, APWeb 2003, Xian, China, Springer.
- Lumpe, M. and J.-G. Schneider (2003). Form-based software composition. Specification and Verification of Component-Based Systems (SAVCBS 2003), Helsinki, Finland, Iowa State University.
- Montgomery, J., M. Randall and T. Hendtlass (2003). Automated selection of appropriate pheromone representations in ant colony optimisation. The Australian Conference on Artificial Life (ACAL2003), Canberra, Australia, University of New South Wales.
- Nevile, L., O. K. Burmeister and C. McCathieNevile (2003). High quality scenarios for raising web content accessibility awareness. HCI International 2003, Lawrence Erlbaum Associates.
- Nevile, L. and O. K. Burmeister (2003). Acting accessibility: scenario-based consideration of Web content accessibility for development and publishing communities. The Twelfth International World Wide Web Conference (WWW2003), Budapest, Hungary, The Association for Computing Machinery.
- Pierrot, H. and T. Hendtlass (2003). Using a modified counter-propagation algorithm to classify conjoint data. 16th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, IEA/AIE 2003, Loughborough, UK, Springer.
- Schneider, J.-G. and L. Johnston (2003). eXtreme programming at universities - an educational perspective. 25th International Conference on Software Engineering (ICSE 2003), Portland, Oregon, IEEE Computer Society.
- Shen, J. and Y. Yang (2003). RDF-based knowledge models for network management. IFIP/IEEE Eighth International Symposium on Integrated Network Management (IM2003), Colorado Springs, USA, Kluwer Academic Publishers.
- Thurairasa, S. and R. Johnson (2003). Is there a need for cyberethics in the middle school curriculum. NZARE / AARE Conference 2003, Auckland, New Zealand.

- Tran, M. H., G. K. Raikundalia and Y. Yang (2003). Methodologies and mechanism design in group awareness support for internet-based real-time distributed collaboration. 5th Asia-Pacific Web conference, APWeb 2003, Xian, China, Springer.
- Vasa, R. and J.-G. Schneider (2003). Evolution of cyclomatic complexity in object oriented software. 7th Workshop on Quantitative Approaches in Object-Oriented Software Engineering (QAOOSE'2003), Darmstadt, Germany, ECOOP.
- Wallace, J. G. and K. Bluff (2003). Numerosity and the consolidation of episodic memory. 7th International Work-Conference on Artificial and Natural Neural Networks, IWANN 2003, Mao, Menorca, Spain, Springer.
- Wijesekera, H. and J. A. Sykes (2003). An ORM based meta-schema to model business processes. Seventh Pacific Asia Conference on Information Systems PACIS 2003, Adelaide, Australia.
- Yan, J., Y. Yang and G. K. Raikundalia (2003). A data storage mechanism for peer-to-peer based decentralised workflow systems. 15th International Conference on Software Engineering and Knowledge Engineering, San Francisco, USA, Knowledge Systems Institute.
- Yan, J., Y. Yang and G. K. Raikundalia (2003). Decentralised coordination for software process enactment. 9th European Workshop, EWSPT 2003, Helsinki, Finland, Springer-Verlag.
- Yan, J., Y. Yang and G. K. Raikundalia (2003). Enacting business processes in a decentralised environment with p2p-based workflow support. 4th International Conference, WAIM 2003, Chengdu, China, Springer.
- Yong, J. and Y. Yang (2003). Data integration over the internet for e-commerce. Third IASTED International conference on Wireless and Optical Communications, Banff, Canada, ACTA Press.
- Yong, J., M. S. Lane, M. Toleman and Y. Yang (2003). Enforcing secure access control in integrated systems over the internet. 1st Australian Information Security Management Conference 2003, Perth, Australia, Edith Cowan University.
- Yu, D., H. Dong, W. Lai and Y. Yang (2003). Projection filling based on contour structural points. International Conference on Computational Science and Its Applications, ICCSA 2003, Montreal, Canada, Springer.
- Yu, Y. T., M. F. Lau and T. Y. Chen (2003). Using the incremental approach to generate test sets: a case study. Third International Conference on Quality Software QSIC 2003, Dallas, Texas, USA, IEEE Computer society.
- Yu, Y. T., S. P. Ng and E. Y. K. Chan (2003). Generating, selecting and prioritizing test cases from specifications with tool support. Third International Conference on Quality Software QSIC 2003, Dallas, Texas, USA, IEEE Computer society.
- Yu, Y. T., P.-L. Poon, S. Ng and T. Y. Chen (2003). On the use of the classification-tree method by beginning software testers. The 2003 ACM Symposium on Applied Computing, Melbourne, USA, Association for computing Machinery, Inc.
- Zhou, Z., B. D. Todd and P. J. Davis (2003). Parallelisation of nonequilibrium molecular dynamics code for polymer melts using openMP. Computational Science - ICCS 2003, Melbourne, Australia and St. Petersburg, Russia, Springer.

Grants

Current Grants in 2003

ARC Discovery Project Grant (2002-4)

D Liley (BSEE Swinburne) and T Hendtlass

Verification of a theoretical model of the dynamical genesis of brain electrical activity

\$50,000

ARC Discovery Project Grant (2003-5)

T Y Chen, T H Tse (University of Hong Kong) and Y T Yu (City University of Hong Kong)

Software testing with enhanced partitioning schemes

\$65,513

ARC Discovery Project Grant (2003-4)

R J Sadus and J M Prausnitz (UC, Berkeley)

Investigation and prediction of the novel properties of dendrimers

\$66,537

ARC SPIRT Grant (APAI) (2001-3)

W Lai and Y Zhong

Layout adjustment and navigation for enterprise geographical information systems

\$23,853 plus \$10,000 from Hypersoft International (Australia) Pty Ltd

Australian Computer Society

D Grant, S Ng, T Y Chen, K Reed (La Trobe) and T Murnane (La Trobe)

Survey of software testing practices in Australia

\$12,000

Defence Science and Technology Organisation (DSTO)

J Han

Enterprise system architectures

\$21,733

Defence Science and Technology Organisation (DSTO) Land Operations Division

K Mouzakis

Soldier combat system interface test bed

\$76,000

HKU SPACE Grant, School of Professional and Continuing Education, University of Hong Kong (2002-3)

F T Chen, T H Tse (University of Hong Kong), D W H Tang (KCRC, Hong Kong) and T Y Chen

A survey of software testing practices

HK\$49,000

Industry Synergy Grant (Altria ITSC Asia Pacific Pty Ltd and Swinburne School of IT)

P Freeman, Y Yang and G Humphries (Altria)

Process enablement for Information Technology Service Centre (ITSC) Asia Pacific

\$25,000

Infoln Pty Ltd

K Mouzakis

Enhancements to the online back-up wizard

\$33,553

National Natural Science Foundation of China (2003-5)

M Li, Y Yang et al

A study on Internet/Web based user-driven requirements acquisition and cooperation mechanisms

RMB220,000

National Natural Science Foundation of China (2003-5)

L Li, Y Yang et al

Research on intelligence software architecture and its component technology

RMB200,000

Research Grants Council, Hong Kong Government (2001-3)

T H Tse (University of Hong Kong) and T Y Chen

CHOC'LATE: a CHOiCe - ReLATion framEwork for test case generation

HK\$387,248

Research Grants Council, Hong Kong Government (2001-3)

Y T Yu (City University of Hong Kong), T Y Chen and P L Poon (Hong Kong Polytechnic University)

WISE_BET: using White-box Information for SElecting Black-box gERated Test cases

HK\$401,917

Swinburne Research Development Grant 2003

M F Lau

Fault based test case generation for complex systems

\$10,636

Swinburne Research Development Grant 2003

B Todd

Molecular simulation of polymer melts under planar shear and elongational flows for realistic flow conditions

\$24,845

Swinburne Vice Chancellor's Strategic Research Initiative Fund (2001-3)

R J Sadus and B D Todd

Molecular motors

\$112,434

Swinburne Vice Chancellor's Strategic Research Initiative Fund (2002-4)

Y Yang, P Joyce, W Lai, G K Raikundalia et al

Internet based e-business ventures

\$216,944

VicRoads

K Mouzakis

Crashstats

\$76,415

Victorian Partnership Advanced Computing (VPAC)

B D Todd and R J Sadus

Molecular dynamics simulations

\$6,000

Grants Awarded in 2003 for 2004

ARC – Discovery Project Grant (2004-6)

M J Brunger (Flinders University) and W Lawrance (Flinders University) and F Wang
Inter and intra molecular interactions probed by electron momentum spectroscopy

\$61,000

ARC - Research Networks (Seed Funding)

C T Chantler, F Wang, et al

XENQ: X-rays, electrons and neutrons in quantum systems: fundamental developments in chemistry
physics to benefit bioscience and industry

Participant in University of Melbourne application

\$10,000

Swinburne Collaborative Research Seeding Grant 2004

T Hendtlass and V N Tran (IRIS)

Technology to assist with the care of severely mentally handicapped people: preliminary
investigations

\$5,000

Swinburne Collaborative Research Seeding Grant 2004 (EIN Pty Ltd and Swinburne)

R Kowalczyk and Y Yang

SENVO: services environment network for virtual organisations

\$47,485

Swinburne Research Development Grant 2004

M F Lau

Fault based test case generation from formal specifications

\$19,359

Swinburne Research Development Grant 2004

F Wang

Electronic structures for organic radicals in configuration and momentum spaces

\$22,067

Swinburne Vice Chancellor's Strategic Research Initiative Fund (2001-3 extension to 2005)

R J Sadus and B D Todd

Molecular motors

\$95,000 for 2004

Victorian Partnership Advanced Computing – Expertise

B D Todd, K Travis (University of Sheffield) and R J Sadus

Diffusion of NO in aqueous micropores

\$33,000

Research Students

In 2003, the following students from the School were awarded the degree of Doctor of Philosophy:

John McCullagh

Soft computing methods to improve rainfall estimation techniques

Coordinating Supervisor: Dr Kevin Bluff

Jilin Wang

Global phase diagrams and critical phenomena of binary mixtures

Coordinating Supervisor: Professor Richard Sadus

In 2003, the following student from the School was awarded the degree of Master of Applied Science:

Jean-Loup Komarower

Architecture for natural language interpretation

Coordinating Supervisor: Dr Kevin Bluff

In 2003, nine new research students commenced (marked with * below). The following table lists the student projects with coordinating supervisors shown in brackets.

Doctor of Philosophy candidates

Todd Bentley (Dr Lorraine Johnston)	Investigating usability in leisure technologies
Jaroslav Bosko (Prof Richard Sadus)	Molecular simulation of dendrimers
Andrew Cain (Prof T Y Chen)	Dynamic data flow analysis for the object oriented paradigm
Jinjun Chen* (A/Prof Yun Yang)	Grid workflow verification techniques
Belinda Choi (Dr Kevin Bluff)	Estimation of geophysical parameters of the atmosphere using hybrid artificial intelligence techniques
Alan Colman* (Dr Lorraine Johnston)	Human factors issues in the design of user-centred object-oriented systems
Mohammed Dewan* (A/Prof Yun Yang)	A value-based e-business modelling approach
Glenn Elliott (Prof Penelope Sanderson)	Adaptive teamwork: a computational model and empirical study
Graham Farrell (Dr Ying Leung)	A study of an online assessment tool with measurements of confidence
Vivienne Farrell (Dr Ying Leung)	Youth and the WWW as a new working and living environment
Nigel Fisher* (Prof Tim Hendtlass)	Optimised 3D rendering using intelligent systems
Jialin Ge (A/Prof Billy Todd)	The state point dependence of classical fluids under shear

Philip Hawthorne (Dr Ying Leung)	Information dissemination and resource discovery in military information systems
Dehao (Aaron) Huang* (Prof T Y Chen)	Component testing
Xiaodi Huang (Dr Wei Lai)	Filtering, clustering and dynamic layout for graph visualization
Thomas Hunt (A/Prof Billy Todd)	Theory and simulation of polymer fluids
Julie James (Prof Angele Cavaye)	An investigation of the interaction of theory and practice in the IS discipline
Ksze Kae Ker* (Prof Jun Han)	A framework for reasoning component software performance
Fei-Ching (Diana) Kuo* (Prof T Y Chen)	Failure -causing pattern based test case selection strategies
Li Li (A/Prof Yun Yang)	Ontology management in multi-agent systems
Robert Merkel (Prof T Y Chen)	Aspects of random testing
Kon Mouzakis (Dr Ying Leung)	Usability of pen based mobile computing devices
Christopher Pilgrim (Dr Ying Leung)	Enhancing WWW navigation through the use of visualisation techniques
Sau Fun (Sharon) Tang (Prof T Y Chen)	Formal inspection techniques for functional specifications
Cameron Taylor* (Prof Tim Hendtlass)	Toward a general collective intelligence algorithm for optimisation
Minh Hong Tran (A/Prof Yun Yang)	Usability experiments for enhancing awareness in real-time collaboration on the Internet
Barry Tyrer (Dr Lorraine Johnston)	Validation of natural language specifications
Rajesh Vasa* (Dr Jean-Guy Schneider)	Detecting deterioration of design flexibility in object-oriented software
Liping Wang (Prof Richard Sadus)	Molecular simulation of complex fluids
Christine Wood (Dr Karola von Baggo)	An analysis of individual and organisational factors that impact successful technology uptake of computerised systems in a large government department
Jun Yan (A/Prof Yun Yang)	A framework and coordination technologies for peer-to-peer based decentralised workflow systems
Jian Ming Yong (A/Prof Yun Yang)	System integration for Internet -based e-commerce in business processes
Donggang Yu (Dr Wei Lai)	Layout adjustment and navigation for enterprise geographical information system
Junfang Zhang (A/Prof Billy Todd)	Non-equilibrium molecular dynamics simulation of planar poiseuille flow

Master of Science candidates

Jingjing (Mandy) Gao
(A/Prof Yun Yang)

Classification of e-business models and approaches

Glenn Ludlow
(A/Prof Yun Yang)

Investigation of enabling technologies for workflow system architecture

Lukman Setiawan*
(Dr Jun Shen)

Information visualisation in distributed workflow environment

International Visitors

Prof J Barrie Thompson, School of Computing Engineering and Technology, University of Sunderland, United Kingdom

Prof Wendy Currie, Department of Information Systems and Computing, Brunel University, London

Prof Michael S Deleuze, Limburgs Universitair Centrum, Departement SBG, Diepenbeek, Belgium

Dr Jerome Delhommelle, Universite Henri Poincare, Vandoeuvre-les-Nancy Cedex, France

Dr Carl Dettmann, Dept of Mathematics, University of Bristol, United Kingdom

Mr WeiQing Dong, Department of Computer Science & Technology, Xi'an Jiaotong University, Xi'an, P R China

Mr Yunwei Dong, Software Engineering Institute, Northwest University, Xi'an, Shaanxi, P R China

Dr Qing Gu, Dept of Computer Science and Technology, Nanjing University, Nanjing, Jiangsu, P R China

Prof Zhiwei Ni, School of Computer Science and Information Engineering, Anhui University, Hefei, Anhui, P R China

Prof John O'Connell, Dept of Chemical Engineering, University of Virginia, Charlottesville, Virginia, USA

Dr Gabriele Raabe, Institut fuer Thermodynamik Technische, Universitaet Braunschweig, Braunschweig, Germany

Dr P Mark Rodger, Reader in Molecular Simulation, Department of Chemistry, University of Warwick, United Kingdom

Prof Stanley I Sandler, Center for Molecular Thermodynamics, University of Delaware

Mr Dave Towey, Department of Computer Science and Information Systems, The University of Hong Kong, Hong Kong

Dr Karl Travis, Department of Chemical and Forensic Sciences, University of Bradford, Bradford, England

Prof Graham Winch, Department of International Business, University of Plymouth Business School, Plymouth, England

Assoc Prof Jian Yang, Infolab, Tilburg University, Tilburg, Netherlands

Mr Zhong Meng Zhao, Department of Computer Science & Technology, Xi'an Jiaotong University, Xi'an, P R China

School Seminars

January 2003

Professor Wendy Currie, Director of the Centre for Strategic Information Systems (CSIS), Department of Information Systems and Computing, Brunel University, London	Value creation from e-business: the ASP model
---	---

March 2003

Dr Feng Wang, Senior Lecturer in Computational Science, Centre for Molecular Simulation, Swinburne University of Technology, Hawthorn	Determination of QSAR/QSPR for drug design: computational and experimental EMS studies of 2,6-Stelladione
Yunwei Dong, Senior Engineer, Institute of Software Engineering, Northwest University, P R China; holder of fellowship, International Institute of Software Technology, United Nations University, Macao	A modeling of workflow model based on Petri-net
Dr Linda Stern, Department of Computer Science and Software Engineering, The University of Melbourne	Algorithm animation in computer science education

April 2003

Dr Carl Dettmann, Lecturer, Dept of Mathematics, University of Bristol, United Kingdom	Chaos and diffusion
Dr Karl P Travis, Lecturer in Modelling Materials, Immobilisation Science Laboratory, Department of Engineering Materials, University of Sheffield, Sheffield, UK	Molecular simulation of confined fluids
Prof John O'Connell, H D Forsyth Professor, Dept of Chemical Engineering, University of Virginia, Charlottesville, Virginia, USA	Molecular dynamics simulation of model surfactants and aggregates

May 2003

Dr Dave Winkler, Senior Principal Research Scientist, CSIRO Molecular Science, Clayton	Computational drug design and complexity
Dr Jim Eales, Senior Lecturer, School of Information Technology, Deakin University	Computer supported collaborative learning (CSCL) in schools, universities and workplaces
Mr Xiaodi Huang, PhD Candidate, School of Information Technology, Swinburne University of Technology	Graph layout: towards practical applications
Prof Ryszard Kowalczyk, Professor in Intelligent Systems, School of Information Technology, Swinburne University of Technology	On fuzzy constraint-based negotiation between intelligent agents

June 2003

John Craick, Manager, Swinburne Usability Laboratory, School of Information Technology, Swinburne University	"Net banking usability & trustworthiness - a view from the test lab" or - "Now, would you recommend that to your family or friends?"
--	--

August 2003

Associate Professor Jian Yang, Infolab, Tilburg University, Tilburg, Netherlands	Service oriented computing: the new computing paradigm for the networked world
Dr Harry Quiney, School of Chemistry, University of Melbourne	Theoretical studies of the heavy elements: the design and implementation of computational algorithms in relativistic quantum chemistry
Dr Jerome Delhommelle, Universite Henri Poincare, Vandoeuvre-les-Nancy Cedex, France	Simulating shear flow without making assumptions about the flow profile

September 2003

Professor J Barrie Thompson, School of Computing Engineering and Technology, University of Sunderland, St Peter's Way, Sunderland, United Kingdom	Some current approaches and trends regarding professionalism in the field of informatics
Professor Stanley I Sandler, Center for Molecular Thermodynamics, University of Delaware	Uses of quantum mechanics in chemical engineering thermodynamics
Professor Tim Hendtlass, Director, Centre for Intelligent Systems and Complex Processes, School of Information Technology, Swinburne University of Technology	An introduction to the Centre for Intelligent Systems and Complex Processes (CISCP)

October 2003

Dr Keiran Lim, Senior Lecturer in Chemical Sciences, Deakin University, Geelong	Computational studies of molecular structure and dynamics
Khaled Khan, School of Computing and Information Technology, University of Western Sydney	Composing security-aware software
Phil Joyce, School of Information Technology, Swinburne University of Technology	Distributed system web server framework
Professor Graeme Shanks, School of Business Systems, Monash University	Representing things and properties in conceptual modelling: an empirical evaluation
Dr Graham Winch, Professor of Business Analysis, Department of International Business, University of Plymouth Business School, England	Thoughts on codifying business models and process models in e-business design

November 2003

Professor Ian Snook, Professor of Condensed Matter Physics, Department of Applied Physics, RMIT	A microscopic simulation of the viscous flow of colloids
Professor Michael S Deleuze, Limburgs Universitair Centrum, Departement SBG, Diepenbeek, Belgium	Theoretical studies of valence ionization and electron momentum spectra using one-electron propagators

December 2003

Dr P Mark Rodger, Reader in Molecular Simulation, Department of Chemistry, University of Warwick, United Kingdom	Simulations of crystal nucleation and inhibition
--	--