

School of Information Technology

# Research Report 2002

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

School Research Committee  
August 2003



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SWINBURNE UNIVERSITY  
OF TECHNOLOGY

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## Message from Dean of IT and Head of School



*Associate Professor Douglas D Grant*

One of Swinburne's five strategic themes is its intention to scale up its research activity, so that the University becomes truly research-intensive. The School of Information Technology is fully committed to ensuring that the University achieves its goal. The School's research mission can be encapsulated as follows:

- To sustain research in a selected range of areas of Computing and Information Technology, chosen for our capacity to succeed as measured by internationally-recognised performance measures.
- To offer excellent research training in these areas to capable PhD students.

This report details the School's research activities in 2002, as driven by that mission.

The year was distinguished by a number of highlights. We were delighted that Professor Richard Sadus and Professor T Y Chen were successful in being awarded ARC Discovery grants. We had a number of distinguished visitors. Following the departure of Professor Penelope Sanderson, who was appointed to a chair at the University of Queensland, the School spent some time re-considering its overall research strategy. Chairs in Component-Based Software Engineering and Intelligent Systems were advertised.

I would like to thank my colleagues in the School for their successful efforts in 2002, and look forward to further exciting research developments in future years.

Douglas D Grant  
Dean of Information Technology  
Head of School of Information Technology

## Message from Chair of Research Committee

In 2002, Swinburne University of Technology is continuing to progress towards research-intensive as one of the missions. At this stage, the School has the following major research centres and groups (alphabetical order):

- CICEC – Centre for Internet Computing and E-Commerce
- CMS – Centre for Molecular Simulation
- CSE – Centre for Software Engineering
- ITIG – Information Technology Innovation Group
- SCHIL – Swinburne Computer-Human Interaction Laboratory

The School is aiming at well-focused research areas to maximise outcomes with the available resources in order to have more high quality publications, to be awarded more research income, and to attract more research students. In 2002, in terms of DEST measurement, the total points were retained at over 40, similar to that in 2001 despite the big jump in comparison to 2000. Grants for research funding in 2002 were significantly improved, particularly with 2 new ARC Discovery Projects granted, as detailed in this report. The School enrolled 9 new research students and two PhD students were awarded the degree in 2002.

This report contains major research activities in 2002 within the School. It addresses the missions of research centres, research projects, grants and associated staff and research students. It also includes the School Seminar Series, international visitors to the School and external activities conducted by staff of the School. There are many other live issues available at our research Web site.

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

Associate Professor Yun Yang  
Chair of Research Committee

## Mission Statements and Staff

### 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.

Rachelle Bosua  
Liz Burley  
Peter Eden  
Viv Farrell  
Phil Freeman  
Phil Joyce

Dr Wei Lai  
Dr Gitesh Raikundalia  
Lukman Setiawan  
Dr Jun Shen  
Dr Baolin (Boris) Wu  
Assoc Prof Yun Yang (Director)

### 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  
Dr Ming Liu  
Prof Richard Sadus (Director)

Assoc Prof Billy Todd (Deputy Director)  
Dr Guangwen Wu  
Dr Zhongwu Zhou

## 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
Assoc Prof Doug Grant	Dr Jim Sykes
Barbara Hurst	Barry Tyrer
Dr Lorraine Johnston	Rajesh Vasa
Dr Wei Lai	

## 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	John Newbigin
Winston Fletcher	Chris Pilgrim
Euan Grant	Dr Karola von Baggo
Kon Mouzakis (Director)	

## 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, social implications of 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

## Research Projects

### Centre for Internet Computing and E-Commerce (CICEC)

#### ***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 peep-to-peer based decentralised workflow***

Y. Yang, G. Raikundalia, 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 modelling, specification and analysis***

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

This project includes two parts: (1) workflow modelling and specification, and (2) workflow analysis. For part 1, in order to support the automation of business processes, they should be abstracted from the real world scenarios and described as workflow specifications using a specification language. In this part, we aim at providing formalism for modelling and specification of workflows. For part 2, 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, 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-centered 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.

### ***Mechanisms for Web-based workflow visualisation***

Yun Yang, Wei Lai, Jun Shen, Xiaodi Huang, Jun Yan, Lukman Setiawan

Although most existing workflow systems support user-friendly interface to some extent, few of them have taken into consideration of the special requirements of workflow visualisation. This short project realises the unique features of visualisation for run-time workflow, i.e., workflow enactment and execution. We present a detailed discussion of the emerging problems against the general aesthetic criteria for drawing the workflow layout. Firstly, Sugiyama's algorithm has been systematically incorporated into our prototype to create well structured workflow layout initially. Secondly, when the workflow process dynamically changes, we can adjust workflow layout by our force-scan algorithm to retain the 'mental maps' created earlier among team members. Thirdly, we have also applied the technique of the fisheye view to offer a context focus mechanism for workflow users and to utilise the screen size more effectively. With these visualisation techniques, a better atmosphere may be facilitated for teamwork.

### ***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 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.

## **Centre for Molecular Simulation (CMS)**

### ***Nanotechnology initiative***

M. Liu, M. Downton, B. Todd, R. 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<sup>+</sup> 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. Wu, R. 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.

### ***Phase equilibria and statistical thermodynamics***

L. Wang, J. Wang, R. Sadus

The results of molecular simulation studies are also being used to improve the traditional basis of thermodynamic prediction. Work is currently in progress in the following areas:

- Intermolecular interactions in aqueous systems.
- Global phase diagrams of mixtures
- Molecular simulation of solid-fluid equilibria.

### ***Nonequilibrium molecular dynamics and transport properties of fluids***

T. Hunt, J. Ge, B. Todd, J. Zhang, Z. Zhou, R. 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.

## **Centre for Software Engineering (CSE)**

### ***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)**

### ***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 (i.e., 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)**

#### ***Undergraduate teaching of common industry format for usability test reports***

K. von Baggo, L. Johnston, T. Bentley and O. Burmeister

A Common Industry Format (CIF) has been proposed as an industry-wide international standard for reporting usability tests by the USA-based National Institute of Standards and Technology (NIST). A significant group of developers world-wide are now trialling this standard. If CIF does become an industry standard, it will have to be taught in an academic environment. The main aim of this project is to examine how undergraduate students enrolled in an introductory HCI course cope with the introduction of CIF. We are specifically investigating whether there may be potential problems in introducing CIF into a multicultural academic environment. An additional aim is to develop and identify methods of teaching the CIF format in an efficient and effective manner.

#### ***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 (i.e. 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 experiments are being carried out.

### ***Building trust in e-banking facilities***

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-banking 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.

## Publications

### Book Chapter

Naikar, N., Lintern, G. and Sanderson, P. (2002) In Cognitive Systems Engineering in Military Aviation Environments: Avoiding Cogminutia Fragmentosa(Eds, McNeese, M. D. and Vidulich, M. A.) Human Systems Information Analysis Center, Wright-Patterson Air Force Base, Ohio, pp. 169-199.

### Journal

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## Grants

### Current Grants 2002

ARC SPIRT Grant (APAI) 2001-2003

W. Lai and Y. Zhong

Layout adjustment and navigation for enterprise geographical information systems

\$22,292 for 2002

Victorian Partnership for Advanced Computing (VPAC Expertise Grant 2002)

B. Todd

Molecular dynamics simulations of the functional domain of the F1-ATPas molecular motor

\$20,000

DSTO Air Operations Division 2002

K. Mouzakis

Research contract for behavioural data analysis for seahawk helicopters

\$42,000

DSTO Land Operations Division 2002

K. Mouzakis

Research contract for soldier combat system interface test bed

\$60,000

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 gEnerated Test cases

HK\$401,917

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

Swinburne University of Technology Research Development Grants Scheme 2002

J-G Schneider

A formal framework for software composition

\$7,500

Swinburne University of Technology Research Development Grants Scheme 2002

B. Todd et al

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

\$25,000

Swinburne University of Technology Research Development Grants Scheme 2002

Y. Yang et al

Software development technologies for supporting programming-for-the-large and programming-for-the-small

\$25,000

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

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

CICEC Group Project: Internet based e-business ventures

\$205,010 for 2002

### **Grants Awarded 2002**

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

\$164,640

ARC Discovery Project Grant (2003-4)

R. Sadus

Investigation and prediction of the novel properties of dendrimers

\$135,000

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

National Natural Science Foundation of China (2003-2005)

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 (2003-2005)

L. Li, Y. Yang et al.

Research on intelligence software architecture and its component technology

RMB200,000

## Students

In 2002, the following students from the School were awarded the degree of Doctor of Philosophy:

### **Pramila Gupta**

*Natural-language-related theoretical foundations for the conceptual modelling process*

Coordinating Supervisor: Dr Jim Sykes

### **Marcus Watson**

*Sonification for anaesthesia: Ecological design and empirical evaluation*

Coordinating Supervisor: Professor Penelope Sanderson

In 2002, the School enrolled the following commencing research students:

Jaroslav Bosko

Haizhen Dong

Jingjing Gao

Li Li

Robert Merkel

Sau Fun Tang

Minh Hong Tran

Christine Wood

Junfang Zhang

## School Seminars

### February 2002

Dr Mark Titchener, Department of Computer Science, University of Auckland	Towards a deterministic information theory: the practical measurement of complexity and chaos
Dr Fabio Pichierri, RIKEN Genomic Sciences Center, Yokohama, Japan	Computational studies on biomolecular elasticity
Dr Graham Winch, Professor of Business Analysis, Department of International Business, University of Plymouth Business School, England	Dynamic visioning for dynamic environments

### March 2002

Dr Anne-Marie Vercoustre, Technology for Electronic Documents (TED) at Mathematical and Information Sciences Division, CSIRO, Melbourne	Wrapping Web pages into XML documents with Norfolk
Dr Jun Shen, Postdoctoral Fellow, Centre for Internet Computing and E- Commerce (CICEC), School of Information Technology, Swinburne University of Technology	Research on multi-agent system based network management models
Dr Matthew Downton, Postdoctoral Fellow, Centre for Molecular Simulation (CMS), School of Information Technology, Swinburne University of Technology	Modelling liquid crystals: disclinations, surface alignment
Professor Brian J Garner, School of Computing & Mathematics, Deakin University, Geelong	Collaborative knowledge modelling

### April 2002

Hanne Nicolajsen, Centre for Tele Information, The Technical University of Denmark	Different use of Web based applications to support coordination and collaboration in dispersed projects
Helen Jewell, Lecturer School of Multimedia and Information Technology, Coordinator Women in Information Technology, Southern Cross University, Lismore	Student perceptions of tertiary study: issues of technology and gender
Dr Huilin Ye, School of Electrical Engineering and Computer Science, The University of Newcastle, Callaghan	A visualized software library: nested self- organising maps for software retrieval and browsing

*May 2002*

Dr Jun Han, Associate Professor, Enterprise and Software Systems, School of Network Computing, Monash University, Frankston, Melbourne	Rich interface specification for software components
Professor Soren Lauesen, IT University of Copenhagen, Denmark	How do you design a good user interface? A software engineering perspective
Dr Adenike Osofisan, Department of Computer Science, University of Ibadan, Ibadan, Nigeria	Knowledge discovery in student database: developing a taxonomy of performance pattern for University of Ibadan
Dr Jo Coldwell, School of Computing and Mathematics, Deakin University, Geelong	A simple model to support eTeaching

*August 2002*

Klaus J Jeppesen, IT University, Copenhagen, Denmark	Improving user support
Catherine Lang, Lecturer, School of Information Technology, Swinburne University of Technology	Addressing the transition needs of post- graduate coursework students in the School of IT
Darren Sommers, Senior Associate in IT Law with Herbert Geer & Rundle Lawyers, Melbourne	"More than Modelling", using legal and commercial means to ensure software delivery
Associate Professor Tim Hendtlass, Director, Centre for Intelligent Systems and Complex Processes, Deputy Head of School, School of Biophysical Sciences and Electrical Engineering, Swinburne University of Technology	Optimizing using collective intelligence

*September 2002*

Associate Professor Frada V Burstein, Knowledge Management Academic Program Director, School of Information Management and Systems, Monash University, Caulfield	A task-based knowledge management framework for supporting knowledge work practices
Clement Leung, Foundation Professor of Computer Science, Victoria University	Semantic visual information search
Assoc Prof Doug Grant, Dean of Information Technology, Swinburne University of Technology	Graph theory applied to web dynamics
Derek Whitehead, Director, Information Resources, Swinburne University of Technology	Reform of the Australian domain name system - more complicated than we thought

*October 2002*

Steven Pereira, General Manager - eTechnology Development, EAN Australia, Oakleigh	The EAN.UCC system for supply chain management
Robert Hillard, Managing Director, Data Architecture and Management, KPMG Consulting Inc.	Trends in data warehousing

*November 2002*

Professor Alistair Moffat, Department of Computer Science and Software Engineering, The University of Melbourne	Compressing, browsing, and searching large documents
Professor Chris Johnson, Chair in Computing Science, Glasgow University	Bruce Willis is braver than you think: a brief overview of the software failures in the ESA/NASA Soho mission interruption
Dr Gabriele Raabe, Institut fuer Thermodynamik, Technische Universitaet Braunschweig, Germany	Vapor-liquid phase equilibria in the system nitrogen-ethane at low temperatures

## International Visitors

Prof T Y Cheung, Chair Professor, Department of Computer Science, City University of Hong Kong, Hong Kong, P R China

Klaus Jul Jeppesen, IT University, Copenhagen NV, Denmark

Prof Chris Johnson, Chair in Computing Science, Glasgow University, Scotland

Dr Hongchen Li, Tsinghua University, Beijing, PR China

Ms Hanne Westh Nicolajsen, Center for Tele-Information, Danish Technical University, Lyngby, Denmark

Dr Adenike Oyinlola Osofisan, Department of Computer Science, University of Ibadan, Ibadan, Nigeria

Dr Fabio Pichierra, RIKEN Genomic Sciences Center, Yokohama, Japan

Dr Pak Lok Poon, Assistant Professor, Department of Accountancy, Hong Kong Polytechnic University, Hong Kong, P R China

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

Dr Jun Shen, Network Research Group, Department of Computer Science & Engineering, Southeast University, Nanjing, P R China

Dr Mark Titchener, Department of Computer Science, University of Auckland, New Zealand

Dr Graham Winch, Professor Business Analysis, Department of International Business, University of Plymouth Business School, Plymouth, England

Assistant Prof Yuen Tak Yu, Assistant Professor, City University of Hong Kong, Hong Kong, P R China

Mr Xiaogang Zhang, Lab for Internet Software Technologies, Institute of Software, Chinese Academy of Sciences, Beijing, P R China

## External Research Activities

Burmeister, O. Referee for Human Factors 2002, Melbourne, November.

Burmeister, O. Member of the organising committee for OZeWAI 2002, Australian web content accessibility information, 27, 28 and 29 November 2002 at Rydges Carlton, Victoria.

Chen, T.Y. External examiner for a MPhil candidate of the Hong Kong Polytechnic University and a PhD candidate of the City University of Hong Kong.

Chen, T.Y. Guest Co-Editor of a Special Issue of Information and Software Technology (Vol. 44, No. 14, 2002).

Chen, T.Y. Program Committee member of International Computer Software and Applications Conference (COMPSAC 01), 2002; IEEE International High-Assurance Systems Engineering Symposium (HASE 02). Organization Committee member of International Symposium on Software Testing and Analysis (ISSTA 2002).

Li, H. Reviewer for Journal of Computer Science and Technology (English Version), China Science Press, Beijing, China, 2002 and the 6th World Multi-Conference on Systemics, Cybernetics and Informatics (SCI 2002), Orlando, Florida, USA, July 2002

Lau, M.F. Reviewer for Information and Software Technology, International Journal on Electronic Markets, the 26th Australasian Computer Science Conference (ACSC 2003), and the 8th Annual Conference on Innovation and Technology in Computer Science Education (ITICSE 2003), 2002.

Ng, S. Session Chair of AI-2002 (Applied Informatics, International Symposium on Software Engineering, Databases and Applications, 18-21 February 2002, Innsbruck, Austria), and Session Chair of ISFST-2002 (International Symposium on Future Software Technology), 23-25 October 2002, Wuhan, China)

Raikundalia, G. K. Reviewer for 2003 Hawaii International Conference on System Sciences, January 6-9, 2003, Hawaii; and International Journal of Information Management and Committee member of Seventh Australasian Document Computing Symposium (ADCS2002), University of Sydney

Shen, J. Reviewer for Journal of System and Software; Future Generation Computer Systems; Seventh Australasian Document Computing Symposium (ADCS 2002), University of Sydney

Yang, Y. External examiner for a PhD thesis of Monash University and a PhD thesis of Macquarie University

Yang, Y. Review Board member for International Journal of Distance Education Technologies, Idea Group Publishing, USA, and Program Committee member for Workshop on Agent Technologies for e-Services (ATES2002), Erfurt, Germany Oct. 7-10, 2002