

School of Information Technology

Research Report 2001

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

School Research Committee

October 2002

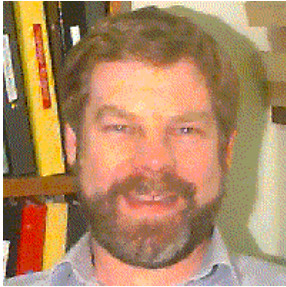


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Message from Dean of IT and Head of School



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 2001, as driven by that mission.

The year's highlights include the award of University Strategic Initiative funding to the Centre for Internet Computing and eCommerce, the award of VPAC grants to the Centre for Molecular Simulation, the award of an ARC Discovery grant to Professor Penny Sanderson, Director of the Swinburne Computer Human Interaction Laboratory, further industrial research funding obtained by the IT Innovation Group, and the School's participation in the CRC for Smart Internet Technology. It is particularly pleasing to observe that the School's publication rate showed significant increase on that in 2000, reflecting growth towards fulfilling its mission.

I would like to thank my colleagues in the School for their successful efforts in 2001, 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

The School of Information Technology is located on the Hawthorn Campus which is only 7km from the Melbourne city centre with convenient transportation and a lovely location.

In 2001, 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

In November 2001, the Director of SCHIL, Professor P. Sanderson, left the School; hence the School is seeking a new Chair and Director. In addition, the Director of AICE – Australian Institute of Computer Ethics, Mr C. Simpson, will retire in early 2002; hence the AICE will no longer be hosted by the School. Furthermore, in 2001 and 2001 only, LATTES – Learning And Teaching of Information Technology, Engineering & Science is hosted by the School, led by Dr I. Macdonald. Moreover, one of the key researchers at CICEC, Dr Rens Scheepers, will leave the School in early 2002.

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 2001, in terms of DEST measurement, the refereed book chapters, journal and conference publications have increased to 4.82, 16.44 and 26.77 points in comparison to 0.33, 11.22 and 15.78 respectively in 2000. Grants for research funding in 2001 are also significantly improved as illustrated in the message of the Head of School and also listed in this report. We have four PhD students been awarded the degree in 2001 which is also a big jump.

This report contains major research activities in 2001 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

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
Dr Rens Scheepers
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 Ming Liu
Prof Richard Sadus (Director)
Dr Billy Todd (Deputy Director)
Dr Guangwen Wu

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

Information Technology Innovation Group (ITIG)



Leaders: Chris Pilgrim and 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.

Andrew Cain
Stuart Cameron
Patrick FitzGerald
Kon Mouzakis
John Newbiggin
Chris Pilgrim
Matthew Smith
Dr Karola von Baggo

Swinburne Computer-Human Interaction Laboratory (SCHIL)



Director: Professor Penelope Sanderson

SCHIL focuses on human-computer interaction (HCI) and cognitive engineering. In SCHIL's state-of-the-art usability laboratory we study better ways of making user-centred systems and devices. We study patterns for usability, user-centred process models for software engineering, and usability evaluation techniques and tools. Cognitive engineering extends HCI to complex real-time mission-critical systems. We study technology-mediated team coordination in high-risk operational environments, cognitive engineering in critical care medicine, and human-system integration in process control, C2, and emergency response centres.

Oliver Burmeister
John Craick (SCHIL Research Manager)
Jennifer Crawford
Dr Peter Higgins
Dr Lorraine Johnston
Dr Jim McLennan
Prof Penelope Sanderson (Director)

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.

Technology of supporting business processes for Internet-based electronic commerce with wide area workflow

Y. Yang, R. Scheepers, J. Yong, J. Yan, J. Shen et al.

Business processes for Internet-based electronic commerce are of strategic importance in all organisations for economic benefits in this digital era in Australia and in the world. This project is aimed at investigating the fundamental issues involved in exploring the new generation of wide area workflow to support business processes for electronic commerce. The outcomes of this project will include a better framework for wide area workflow and novel mechanisms of tool interface and user interface for supporting computer-mediated business processes.

Workspace awareness support for real-time cooperative editors on the Internet: A framework and experimental evaluation

Y. Yang, G. Raikundalia, M. H. Tran et al.

Internet-based collaborative software technology is of strategic importance and great benefit to Australia, with its population geographically dispersed over highly distant areas. This project investigates fundamental conceptual and practical issues in supporting users’ mutual awareness in Internet-based real-time collaborative editors. The collaboration needs of users are identified, appropriate supporting features identified, and enhanced collaborative editors evaluated in an experimental study with trial users.

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.

Implementation of Web-based technologies in and between organisations

R. Scheepers, et al.

Many organisations are currently seeking to harness the fruits of the Internet revolution, not only for e-commerce, but also for enhancing cross boundary information sharing and collaboration, support knowledge management, etc. This research examines the opportunities, and managerial challenges associated with implementing Internet-based technologies, and in particular Web-based technologies, within and between organisations. The primary focus is on the implementation of organisational Intranets and Extranets. The outcomes of the research project are managerial frameworks, principles and implementation guidelines which seek to highlight and address the organisational risks and reduce the incidence of failure in such endeavours. Some of the research is done in collaboration with external partners in Denmark and the UK.

Trust dimensions in electronic commerce

V Farrell, P. Joyce, R. Scheepers, et al.

Trust relationships between parties engaging in electronic commerce is an underlying prerequisite for most online transactions. This research investigates various aspects pertaining to trust in online environments, both in business-to-consumer and business-to-business contexts. Some of the early research outputs can be found [here](#).

Centre for Molecular Simulation (CMS)

Nanotechnology initiative

M. Liu, 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⁺ 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, 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.

Object-Oriented Software Testing at the Class and Cluster Levels

T. Y. Chen et al.

In this project, we propose a methodology for object-oriented software testing at the class and cluster levels. At the class level, we focus on testing of behavioural equivalence and non-equivalence. At the cluster level, we investigate the interactions among composite message-passing sequences.

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.

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)

HeadLine 2000 Data Capture and Management Support System

ITIG Group

This project involved the development of an integrated handheld computing system and associated tools to support the evaluation of trials.

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

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.

Swinburne Computer-Human Interaction Laboratory (SCHIL)

Cognitive work analysis, AEW&C, and operational test and evaluation

P. Sanderson

The Commonwealth of Australia's forthcoming Airborne Early Warning and Control (AEW&C) platform is being developed by Boeing. As the AEW&C systems are developed at Boeing, the Commonwealth will take AEW&C through an Operational Test and Evaluation (OT&E) stage before full acceptance. Cognitive engineering researchers at SCHIL are helping DSTO develop an analytic framework for guiding OT&E. The framework builds upon the framework developed for AEW&C tender evaluation in previous years.

Cognitive engineering approaches to informative anesthesia systems

P. Sanderson, M. Watson

At present, alarms in operating rooms and intensive care environments are poorly differentiated by users. Alarms are often ignored because they seldom convey information that must be acted upon. HCI researchers are starting to work with health care specialists to provide integrated IT solutions that will provide more timely, accurate and interpretable information about alarms to be used in high risk, time-restricted environments. In the present research we apply cognitive engineering principles to this problem, with a view to developing a theoretical and practical basis for the design of operating theatre information systems in the future. We have developed a sonification, or continuous auditory display, of patient respiratory information. Investigations with anesthetists and non-anesthetists reveal benefits of sonification when participants must timeshare patient monitoring tasks with other tasks.

Information integration in support of intensive care nursing practice

P. Sanderson, A. Miller

In the ICU environment, information about a critically ill patient's condition arrives in different media and on different time schedules. However, it needs to be physically and mentally integrated by ICU nursing personnel to judge patient status, evaluate the success of current treatment and care plans, and determine a future course of action. In this study we use interview and observational techniques to characterise the ICU work domain, the diagnostic reasoning required, and so to proposed alternative information delivery, integration, and display systems to support ICU nursing. The research performed under this project is mounting a significant challenge to conventional methods for performing Cognitive Work Analysis.

Usability Patterns and Design Reuse

L. Johnston, M. Mahemoff (University of Melbourne)

The ensuring of usability for a software product can be a tedious and time-consuming activity. In other engineering disciplines, a productivity advantage can be gained when artefacts are reused from an earlier development. This research considers how to capture best-practice design information relating to the user interface, with the intention of applying that knowledge in future developments. Coding and design

patterns have already been shown to be extremely useful in software development, and we are investigating the suitability of patterns for use in interaction design, and the way in which a pattern language might support the development process. Additionally, we are investigating how generic design information can be used to assist interaction designers. In both instances, the work is aimed at reducing the development time through reuse of interaction design information.

Affective Factors and Software Design

L. Johnston, T. Bentley

As it is now possible for all developers to make their software effective and efficient, the marketplace will differentiate between competing products on the basis of the overall user-experience, rather than just on usefulness and usability. Currently, emotions such as joy, fun, stress and pleasure tend to be ignored in the design of software, and we lack reproducible ways of evaluating these affective attributes. However, the qualities are quickly becoming integral requirements for design – particularly in systems intended for leisure pursuits (e.g. games), where fun has been described as "centrally relevant" to success.

This research is exploring these emotional elements and how they can be formally addressed in the design of software, i.e. going beyond design for productivity to design for the quality of experience. There are two major aims of the research program: to begin describing the components of affect in relation to Human Computer Interaction, and to define and test possible measures of affect.

Usability Issues in the Software Development Process

L. Johnston

Within the usability community, it is well-known that the achievement of *usability* in a product requires an iterative process. This is much less understood in the general software development community, where usability is often considered to need attention in the later stages of development. In general, there have been few attempts to integrate usability concerns into the development process. This project focuses on methods and techniques that can be offered to software engineers to improve the usability outcome and to shorten the development time for software products.

The Common Industry Format for Reporting Usability Test Results: Applicability for Academia

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

The Common Industry Format (CIF) is being promoted as an international standard for reporting usability test results, and we believe it needs to become part of the training of the professional body. Future Human Computer Interaction (HCI) professionals are often first exposed to HCI issues during their university education, and what they learn in this context is likely to influence their practice of the discipline in the future. While the CIF has been developed for the context of user-based testing on a finished product, students also need to be exposed to other forms of usability testing. Therefore it has been necessary to tailor the CIF to suit the different forms of evaluation. In this way, future HCI professionals will learn how to apply their skills professionally during the entire design of a product, reinforcing the iterative nature of software development and evaluation.

This project examines the usefulness, flexibility, acceptability and learnability of the CIF guidelines in an academic HCI teaching environment. In particular, we wish to

know whether, and/or how, the CIF can be successfully incorporated into this environment. An additional issue is the acceptance of a CIF amongst people of different educational backgrounds and its usefulness to practitioners whose first language is not English.

Multimodal displays for anaesthesia sonification: timesharing, workload, and expertise

J. Crawford, O. Burmeister, P. Sanderson, M. Watson,

In this project we compare the results of two studies that examine physiological monitoring using different mixtures of visual and auditory displays. Physiological monitoring is necessary in health care contexts in which a patient is anaesthetised or heavily sedated. Our goal is to determine the safest format for keeping the practitioner informed about the patient's state, taking into account other tasks that need to be performed.

Continuing evolution of best practice principles in designing for web accessibility

O. Burmeister, G. Sampson

Web accessibility for people with disabilities, particularly those with vision impairment is an issue of prominence due to the publicity surrounding the recent SOCOG court case. Implications for web site design arise from interpretations of the Disability Discrimination Act as it was interpreted for that case, as well as recommendations by HREOC and W3C. There are categories of compliance that designers need to understand. These categories are still evolving.

Publications

Book Chapter

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Conference

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Grants

In 2001, the School has the following (ongoing) grants:

- ARC SPIRT Grant 2001-2003
P. Sanderson
If IT Does Not Work for People, Does it Work At All? Human Supervisory Control in a Dynamic Electricity Market
\$54,800 for 2001
- ARC SPIRT Grant (APAI) 2001-2003
W. Lai and Y. Zhong
Layout adjustment and navigation for enterprise geographical information systems
\$22,292 for 2001
- DIST
P. Sanderson and Y. Leung
Cooperative Research Centre for Smart Internet Technology (2001-2007)
\$22million in total for entire CRC - Sanderson and Leung were two of around 20 researchers across eight universities who were named on the grant.
- DSTO AOD Research Agreement
P. Sanderson
Cognitive engineering research on capability priority modeling for AEW&C
\$30,000
- Victorian Partnership for Advanced Computing (VPAC 2001) Expertise Grant for Postdoctoral Research Fellow.
B. Todd and R. Sadus
Mechano-chemical simulation of a real biological molecular motor
\$63,206
- Ericsson Radio Systems, Sweden
K. Mouzakis, C. Pilgrim and K. Von Baggo
Ericsson Radio Systems Project
\$15,000
- DSTO Adelaide
K. Mouzakis and C. Pilgrim
Portable Data Recorder
\$22,920
- DSTO Adelaide
K. Mouzakis and C. Pilgrim
DSTO Headline 2001
\$45,480
- AMRL, Melbourne
K. Mouzakis and C. Pilgrim
AMRL Behavioral Data Analysis System
\$20,000
- Victorian Partnership for Advanced Computing (VPAC Expertise Grant 2001)
B. Todd and P. J. Davis
Non-equilibrium molecular dynamics simulations of the rheology of realistic model polymer melts
\$10,000
- Netstar Austral
R. Scheepers

- Internet Infrastructure
\$31,500
- Swinburne Vice Chancellor's Strategic Research Initiative Fund (2001-3)
R. Sadus and B. Todd
Computational Nanotechnology
\$224,000 for 2001
 - Swinburne Vice Chancellor's Strategic Research Initiative Fund (2001-3)
P. Sanderson
Cognitive Systems Engineering Research Group Academic Research Initiative
\$124,000 for 2001
 - Swinburne University of Technology Research Development Grants Scheme
2001
P. Sanderson and W. Russell
Extending ecological interface design to auditory interfaces for dynamic event-driven worlds
\$20,000
 - Research Grants Council, Hong Kong Government (2001-3)
T. H. Tse (University of Hong Kong) and Chen, T.Y.
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), Chen, T.Y. and P. L. Poon (Hong Kong Polytechnic University)
WISE_BET: using White-box Information for SElecting Black-box gENERated Test cases
HK\$401,917

In 2001, the School has the following new grants awarded for the future:

- ARC Discovery Project Grant (2002-4)
P. Sanderson
Sonification for complex, mission-critical work environments
\$259,000
- Swinburne Vice Chancellor's Strategic Research Initiative Fund (2002-4)
Y. Yang, R. Scheepers, P. Joyce, W. Lai and G. K. Rakundalia
CICEC Group Project: Internet based e-business ventures
\$630,000
- Swinburne University of Technology Research Development Grants Scheme
2002:
 - J-G Schneider
A formal framework for software composition
\$7,500
 - B. Todd et al.
Molecular simulation of polymer melts under planar shear and elongational flows for realistic flow conditions
\$25,000
 - Y. Yang et al.
Software development technologies for supporting programming-for-the-large and programming-for-the-small
\$25,000

Students

In 2001, the following students from the School were awarded a PhD degree:

- Bruce Calway
- Jennifer Carroll
- John Fabre
- Gianluca Marcelli

In 2001, the School enrolled the following commencing research students:

- Rachelle Bosua (part-time PhD)
- Graham Farrell (part-time PhD)
- Vivienne Farrell (part-time PhD)
- Glenn Ludlow (part-time MAppSc)
- Kon Mouzakis (part-time PhD)
- Barry Tyrer (part-time PhD)
- Liping Wang (full-time PhD)
- Jun Yan (full-time PhD)
- Donggang Yu (full-time PhD)

School Seminars

February 2001

Prof Robert Spence
Professor of Information Engineering,
Imperial College, London

Automated Design: Why it doesn't work,
what you can do about it and the
answers we still don't have

March 2001

Assoc Prof Wing S (Vincent) Chow
School of Business, Hong Kong Baptist
University.

Building consumers trust in e-commerce

Prof David Abramson
Head of School, School of Computer
Science and Software Engineering,
Monash University

From PC cluster to a global
computational grid

Dr Ian Macdonald
Director of the Centre for LATTES,
Swinburne University of Technology

A mouthful of LATTES: Learning and
teaching in a university environment

Dr B L William Wong
Director, Multimedia Systems Research
Laboratory, Department of Information
Science, University of Otago, New
Zealand

Situation awareness, planning and
decision making in emergency medical
dispatch at the London Ambulance
Service

April 2001

Dr Rajiv Khosla
Department of Accounting and
Management, School of Business, La
Trobe University

Human-Centred Multi-Agent Systems

Prof Igor Hawryszkiewicz
Faculty of Information Technology,
University of Technology, Sydney

Creating networking communities for
knowledge sharing

Prof Kai-Yuan Cai
Department of Automatic Control, Beijing
University of Aeronautics and
Astronautics, Beijing

Software Reliability Testing and
Controlled Markov Chains

May 2001

Assoc Prof Yun Yang
Director of Centre for Internet Computing

A framework for software development
and integration

and E-Commerce, School of Information Technology, Swinburne University of Technology

Dr Wei Lai
Senior Lecturer, School of Information Technology, Swinburne University of Technology

Dr Weiping Zhu
Australian Defence Force Academy, University of NSW, Canberra

Assoc Prof Jan Newmarch
School of Network Computing, Monash University

June 2001

Marcus Watson
Swinburne Human Computer Interaction Laboratory, Swinburne University of Technology

Gerhard M. Schneider
Department of Chemistry, Physical Chemistry, University of Bochum, Germany

Dr Qiwen Xu
Faculty of Science and Technology, University of Macau, Macau SAR, P.R. China

August 2001

Thomas Hunt
Centre for Molecular Simulation, School of Information Technology, Swinburne University of Technology

Dr Qiwen Xu
Faculty of Science and Technology, University of Macau, Macau SAR, P.R. China

Prof Jiaying Cheng
Department of Computer Science, Key Lab of Computing & Signal Processing, Ministry of Education, Anhui University, P R China

Diagram Layout and Applications

Using clustered Queue Structure for Shared-Memory Multiprocessor Systems

Courseware and the Web: University Power Structures, Intellectual Property and Lessons from Open Source

Design and evaluation of auditory displays for medical devices

High-Pressure Investigations on Pure Substances and Fluid Mixtures: Phase Equilibrium, DTA, DSC and Diamond Anvil Studies up to about 1 GPa

An Operational Semantics of a Subset of Verilog Hardware Description Language

Understanding the flow of polymeric liquids: simulations, theory and experiment

Verification of Concurrent Programs

Effective algorithms to calculate parameters on train control problem

Dr Qing Gu
Dept of Computer Science and
Technology, Nanjing University, Nanjing,
210093, Jiangsu, P R China

Event sequencing constraints based
distributed program testing

Assoc Prof Doug Grant
Dean of Information Technology,
Swinburne University of Technology

The Profession of IT, and Software
Engineering

September 2001

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

Some Current Approaches and Trends
Regarding Professionalism in the Field
of Informatics

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

But is IT really Engineering? (An
illustrated journey of discovery)

Dirk Peters
Fachbereich Informatik, Universitaet
Dortmund, Dortmund, Germany

Mobile Code Security

Braam van Dyk and Izak Nieuwoudt
Institute for Thermal Separations
Technology, University of Stellenbosch,
Stellenbosch, South Africa

Computer Aided Solvent Design

October 2001

Assoc Prof Jan Newmarch
School of Network Computing, Monash
University

Ownership and other properties of
internet objects

Dr Shirley Gregor
Professor of Information Systems,
School of Business and Information
Management, Australian National
University

Developing a Virtual Organization:
serendipity or strategy?

Klaus Jeppesen
IT University, Copenhagen, Denmark

Successful Software Engineering

November 2001

Prof Chaochen Zhou
Director of International Institute for
Software Technology, United Nations
University

A Formal Description of Hybrid Systems

International Visitors

Prof Kai-Yuan Cai, Dept of Automatic Control, Beijing University of Aeronautics and Astronautics, P R China

Professor Jiaying Cheng, Department of Computer Science, Anhui University, P R China

Assoc Prof Vincent Chow, School of Business, Hong Kong Baptist University

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

Prof Soren Lauesen, IT University, Copenhagen, Denmark

Izak Nieuwoudt, Institute for Thermal Separations Technology, University of Stellenbosch, Stellenbosch, South Africa

Mr Dirk Peters, Fachbereich Informatik, Universitaet Dortmund, Germany

Prof Gerhard M Schneider, Department of Chemistry, Physical Chemistry, University of Bochum, Germany

Prof Robert Spence, Department of Electrical and Electronic Engineering, Imperial College of Science Technology and Medicine, University of London, United Kingdom

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

Braam van Dyk , Institute for Thermal Separations Technology, University of Stellenbosch, Stellenbosch, South Africa

Dr William Wong, Department of Information Science, University of Otago, New Zealand

Dr Qiwen Xu, Faculty of Science and Technology, University of Macau, P R China

Dr YT Yu, Department of Computer Science, City University of Hong Kong, Hong Kong

Prof Chaochen Zhou, International Institute for Software Technology, United Nations University, Macau, P R China

External Research Activities

Chen, T.Y. Program Co-Chair of the Second Asia-Pacific Conference on Quality Software (APAQS 2001), 2001.

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

Chen, T.Y. Program Committee member of International Computer Software and Applications Conference (COMPSAC 01), 2001.

L. Johnston. Reviewer for IEEE Software, 2001

P. Joyce. Program Committee member of Pacific and Asia Rim conference on Information Systems (PACIS), Seoul, Korea, 2001 & Conference on Electronic Commerce (Collector), Coffs Harbour, Queensland, Australia, 2001 & The 12th Australian Conference on Information Systems (ACIS) , Coffs Harbour, Queensland, Australia, 2001 & Bled International Conference on Electronic Commerce, Bled, Slovenia, 2001

G. Raikundalia. Conference Chair and Program Committee member of 6th Australasian Document Computing Symposium (ADCS), Coffs Harbour, Australia, Dec. 2001

G Raikundalia. Reviewer for Joint 8th European Software Engineering Conference (ESEC) and 9th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE-9)

G. Raikundalia. Reviewer for 8th Asia-Pacific Software Engineering conference (APSEC 2001)

R. Sadus. Reviewer for the American Institute of Chemical Engineers Journal, Chemical and Engineering Data, Computer Methods in Applied Mechanics and Engineering, Environmental Science and Technology, Fluid Phase Equilibria, Industrial and Engineering Chemistry Research, International Journal of Modelling and Simulation, Macromolecules, Molecular Physics, Physical Chemistry Chemical Physics (PCCP), and the Journal of Chemical Physics, 2001

P. Sanderson. Editorial Board of *Cognition, Technology, & Work*. Reviewer for *Human Factors*. Reviewer for CHI, OzCHI, Interact'01, Australian Research Council.

B. Todd. Reviewer for the Journal of Chemical Physics and Computer Physics Communications, 2001

Y. Yang. Program Committee member of Joint 8th European Software Engineering Conference (ESEC) and 9th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE), Vienna, Austria, Sept. 2001 & 4th Asia Pacific Web Conference (APWeb), Changsha, China, Nov. 2001

Y. Yang. Reviewer for IEEE Transactions on Knowledge and Data Engineering, and IEEE Internet Computing, 2001