



Department of Computer Science and Software Engineering

2010 Departmental Post-Graduate Conference

Tuesday 31st August and Wednesday 1st September 2010

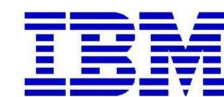
Lecture Theatre 031
Erskine Building (Maths and Computer Science Building)



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Tuesday 31st August (room 031)

Session 1 – Keynote/Honours

Chairperson: Moffat Mathews

- 8:30 8:45 Coffee / Tea/Orange Juice and muffins
- 8:45 9:00 Welcome by Acting Conference Chair Amali Weerasinghe
Opening address by Prof. Tim Bell and Dr. Richard Green
- 9:00 9:30 Keynote: Prof Jan-Evans Freeman (PVC Engineering)
- 9:30 9:50 Lukas Korsika: Coroutines: Applications and Implementations.
- 9:50 10:10 James Ashford: Dynamic Visualisation of Software State.
- 10:10 10:30 Oliver Cardwell: Comparative Performance Analysis of Inverse Kinematic Algorithms in 2D Space.
- 10:30 10:50 *MORNING REFRESHMENTS*

Session 2 – Honours

Chairperson: David Thomson

- 10:50 11:10 Colin Fagg: Precise Tools and Specifications for Accurate Metric Results.
- 11:10 11:30 Joshua Oosterman: Measuring Evolving Software.
- 11:30 11:50 Linda Pettigrew: Process Metrics: Measuring Software Development Activities.
- 11:50 12:10 Joey Scarr: Utilising GUI/Command Blur to Support the Novice to Expert Transition
- 12:10 12:30 Nelson Shaw: Fast automated estimation of variance in quantitative stochastic simulation.
- 12:30 12:50 Martin van Zijl: Towards a Motivationally Intelligent Pedagogical Agent.
- 12:50 1:10 Luke Williams: Clarity from chaos - Simplifying network log visualization.
- 1:10 1:50 LUNCH

Your Name:

Choose one	Session 7 – PhD	
	Name:	Title:
	Tipawan Silwattananusarn:	An Investigation of Classifying Species and Function of Thai-Herbs using DNA sequences.
	Ehsan Tabatabaei Yazdi:	Adaptive Resource Allocation for mobile Body Sensor Networks.
	Mohammed Thaher:	An efficient algorithm for the kth maximum convex sums.
	Susanne Tak:	Your windows through my eyes - a longitudinal study of window use.
	Amali Weerasinghe:	Developing a General Model for Supporting Tutorial dialogues in Intelligent Tutoring Systems.

Session 3 – MSc

Chairperson: Philip Buchanan

1:50	2:10	Alexander Chernoglazov: Improving visualization of large multi-variate datasets: new compression and rendering techniques using a hardware-accelerated approach.
2:10	2:30	Geoff Clark: Dynamic Optimisation of a Heterogeneous Wireless Network of Sensors.
2:30	2:50	Linlin Ke: Design and Implementing SABSA forensics Overlay - Developing Forensically Sound Application.
2:50	3:10	Ben McDonald: Automating the Layout of Media for Large, Shared Displays.
3:10	3:30	<i>AFTERNOON REFRESHMENTS</i>

Your Name:

Choose one	Session 8 – MSc & PhD	
	Name:	Title:
	Sayan Ray:	A Fast and Simple Scheme for Mobile Station-Controlled Handover in Mobile WiMAX Networks.
	Thomas Young:	A brief review of recent research in Evolutionary Development.
	Janina Voigt:	Improving OO with software contracts.
	Dominic Winkler:	Improving the efficiency of selecting and manipulating items across multiple contexts.

Session 4 – MSc

Chairperson: Linda Pettigrew

3:30	3:50	Ahmed Qaisi: Network Forensics and Log Files Analysis: A Novel Approach to Building a Digital Evidence Bag and Its Own Processing Tool.
3:50	4:10	Chiang Tay: A Robust Image Analysis System for Biopsy Tissue Image.
4:10	4:30	Russell Tomes: Managing Security and Quality of Service Performance on IEEE 802.11n Wireless LANs.
4:30	4:50	Tobias Wulff: Mitigation of Malicious Traffic in SIP-based VoIP Applications in a Broadband Internet Environment.
4:50	5:10	Chunhui Zheng: Vision-based Navigation Assistant For Robotic Wheelchair In Indoor Environment.
5:10		<i>CLOSE OF DAY ONE</i>

Wednesday 1st September (room 031)

Session 5 – PhD

Chairperson: Dr. Neville Churcher

- 8:30 9:00 Coffee / Tea/Orange Juice and muffins
- 9:00 9:30 Keynote: Prof Paul Fleming
- 9:30 9:50 Mohammed Algarni: Morphology and Arabic Information Retrieval.
- 9:50 10:10 Muhammad Asad Arfeen: Online Performance Evaluation of Future Internet and its Applications.
- 10:10 10:30 Philip Buchanan: Modifying Visual Style Using Characteristic Proportions.
- 10:30 10:50 *MORNING REFRESHMENTS*

Session 6 – PhD

Chairperson: Dr. Brent Martin

- 10:50 11:10 Jaco Fourie: The Blind Deconvolution of Binary Images Using Harmony Search.
- 11:10 11:30 Mofassir Haque: Challenges to Future Internet Design.
- 11:30 11:50 Mashitoh Hashim: New Algorithms and Data Structures for Solving the All-pairs Shortest-path Problem.
- 11:50 12:10 Moffat Mathews: Multiple, adaptable pedagogical strategies in Intelligent Tutoring Systems.
- 12:10 12:30 Mohammad Obaid: Facial Expression Representations and Animation using Quadratic Deformation Models.
- 12:30 12:50 Kapila Pahalawatta: Adaptive Histogram Particle Segmentation and Classification.
- 12:50 1:30 *LUNCH*

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Choose one	Session 5 – PhD	
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	Mohammed Algarni:	Morphology and Arabic Information Retrieval.
	Muhammad Asad Arfeen:	Online Performance Evaluation of Future Internet and its Applications.
	Philip Buchanan:	Modifying Visual Style Using Characteristic Proportions.

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Chairperson: Dr Mukundan

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4:30	4:50	Dominic Winkler: Improving the efficiency of selecting and manipulating items across multiple contexts.
4:50		Closing Address by conference chair Ehsan Tabatabaei Yazdi And Dr. Richard Green

* **Award ceremony – Staff Club**

* **Retire to the Staff Club for end-of-conference function and presentation of certificates and conference prizes**

Abstracts

Keynote: Prof Jan-Evans Freeman (PVC Engineering)

Keynote: Prof Paul Fleming

Honours:

James Ashford: Dynamic Visualisation of Software State.

Software is typically large and complex making it hard to develop and maintain. During the evolution and development of software developers may encounter faults or bugs within their code. Often these bugs are hard to diagnose because the set of circumstances which cause the bug are unknown or hard to identify. Visualisations are able to help a developer understand the changing state of software and recognise where potential faults lie. We have developed a suite of such visualisations. Our tool works within the Eclipse Debugger perspective whereby a data collection point is inserted in a single line of code and data collection occurs whenever that line is executed. This allows a developer to visualise the situation leading up to any fault occurring with the full scope of variables available for review. We discuss our progress and potential in this tool including considerations for large applications using information hiding techniques such as 'degrees of interest'.

Oliver Cardwell: Comparative Performance Analysis of Inverse Kinematic Algorithms in 2D Space.

The cyclic coordinate decent (CCD) algorithm is a common inverse kinematic algorithm used in robotics and computer animation. Despite the algorithm's simplicity and popularity there is little understanding on its behaviour and under what conditions it performs optimally or not at all. In this work we attempt to analyse the performance characteristics of this iterative algorithm using metric maps to help visualise various metrics including the coverage and convergence of a given configuration. We also introduce a new inverse kinematic technique that uses the Newton-Raphson method to solve for joint angles.

Colin Fagg: Precise Tools and Specifications for Accurate Metric Results.

Software systems are often hard to analyse due to their large size, complexity and mutability. Software metrics can help by aggregating this information into more easily understood data so a wide range of metrics have been proposed and are in use academically and industrially. Ambiguities such as whether constructors count as methods or if interfaces count as classes can affect the implementation and consequently results of metrics. Even well known metrics are underspecified and subject to interpretation, impacting the application and analysis of comparative results. The goal of this project is to identify possible ambiguity in the specification of metrics and to create a metric framework that explicitly details the implementation of a metric. The identification of ambiguity in these metrics is also used to create novel metrics based on implementation differences.

Lukas Korsika: Coroutines: Applications and Implementations.

Coroutines are a flow control construct in programming languages. Variants of coroutines have seen increasing implementation in modern programming languages including C# and Python, and they can provide a much more readable, concise, and efficient way of solving a range of programming problems. Our research identifies a set of criteria for classifying

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coroutine implementations in existing languages. This provides an interesting study of the various design decisions that must be made when implementing coroutines. Such a reference is also interesting because the literature lacks an in-depth survey of the state of coroutine implementation approaches in modern programming languages. Further, an investigation was performed into the types of problems which can be expressed more succinctly using coroutines. Coroutines provide solutions to problems which require of a series of transformations on a stream or streams of data, such as compilers and state machines, especially those which deal with infinite or practically infinite data streams.

Joshua Oosterman: Measuring Evolving Software.

Software metrics exist to measure aspects of software such as size, quality and complexity. These metrics are usually run against a single version of the source code, and thus reveal nothing about its evolution or history. We have developed a metric gathering tool, using a novel model of code evolution. The model is built incrementally from past versions of the source code, which are mined from a source control repository. Existing technologies such as the Java Symbol Table (JST) and Code Critick were combined with our novel JSTDiff and EvoJava technologies to build an accurate and rich model. We have instrumented our tool over software engineering students' final year group projects, over hundreds of versions from their SubVersion repositories. Repository metrics, evolution metrics and traditional metrics from the literature were measured. We discuss the findings so far, in regards to 1) the quality and complexity of software as it ages, and 2) the correlations between complexity & evolution metrics.

Linda Pettigrew: Process Metrics: Measuring Software Development Activities.

A final software product is the result of many low level additions and deletions of code, reading and comprehension of code written by others, test runs, debugging runs and numerous other actions. Although the final code is a result of these microlevel actions very little is known about this process. This project uses an eclipse plugin to study a group of developers in an attempt to gain greater understanding of the actions developer perform when developing software.

Joey Scarr: Utilising GUI/Command Blur to Support the Novice to Expert Transition.

Traditional wisdom in Human-Computer Interaction states that user interfaces should provide shortcuts for expert users. These shortcuts are traditionally provided in the form of hotkeys. However, while these and other keyboard-based commands provide high performance benefits, existing research shows that they are rarely employed by users. In this project we developed a taxonomy of factors surrounding the learnability of interfaces, and built upon this to create a novel system called Blur. Blur is a global command line interface that automatically mirrors the functionality of existing GUIs, providing a command invocation technique that aims to be faster than the GUI and more learnable than hotkeys. It utilises rich visual feedback, intuitive typeahead functionality, and self-demonstration in order to support learnability and the transition from "novice" to "expert" user.

Nelson Shaw: Fast automated estimation of variance in quantitative stochastic simulation.

Quantitative stochastic simulation is an important tool in assessing the performance of complex dynamic systems such as modern communication networks. Because of the proliferation of computers and devices that use and rely on networks such as the internet, assessing the performance of these networks is important to ensure future reliability and service. The current methodology for the analysis of output data from stochastic

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simulation is focused mainly on the estimation of means. Research on variance estimation focuses mainly on the estimation of the variance of the mean, as this is used to construct confidence intervals for the estimated mean values. To date, there has been little research on the estimation of variance of auto correlated data, such as those collected during steady-state stochastic simulation. This research investigates different methodologies for estimation of variance of steady-state and terminating simulation. Results from the research are implemented in the simulation tool Akaroa2.

Martin van Zijl: Towards a Motivationally Intelligent Pedagogical Agent.

Intelligent Tutoring Systems aim to teach a domain using personalized feedback and instruction. EER-Tutor is one such system, developed at the University of Canterbury, which teaches EER-Modeling. For this project, we aimed to detect and address the motivation levels of students using EER-Tutor. An evaluation in early September will indicate how successful our attempts were.

Luke Williams: Clarity from chaos - Simplifying network log visualization.

In this research we analyse network logs from small businesses in order to show common trends. We show how visualization of low level network data can be used to present information in ways which help non-experts understand network events and the overall state of the network. One of the major hurdles that is faced by all researchers in the area of network visualization is the size of the data sets and scaling, we will discuss the approach we have taken to this problem.

MSc students:

Alexander Chernoglazov: Improving visualization of large multi-variate datasets: new compression and rendering techniques using a hardware-accelerated approach.

GPGPU (General Purpose Computing on Graphics Processing Units) is an active field of research in Computer Science that has found application in a number of areas such as image processing, fluid dynamics simulation and molecular modeling. Visualisation of CT and MRI scan results by means of volume rendering is another problem that can be solved using GPGPU technology. Quite often, the datasets generated by modern CT scanners are extremely large and a new advance in X-ray technology - spectral CT imaging - has further increased their size, making the visualisation of such datasets even more resource-consuming than before. This project is concerned with developing a GPGPU-oriented approach for visualising spectral CT data, with its main goals being the creation of compression algorithms and acceleration techniques specifically tailored for GPU architectures.

Geoff Clark: Dynamic Optimisation of a Heterogeneous Wireless Network of Sensors.

This talk will present an MSc research project aimed at solving a dynamic optimisation problem posed by Commtest, a Christchurch-based producer of vibration sensors. The goal of this study is to consider the dynamic network optimisation problem in a wireless heterogeneous network of sensors where only nodes on the edge of the network perform sensing and data collection using their own internal battery. A optimisation method is required that creates minimal drain on the battery life of the sensors, while still maintaining accurate and reliable transmission of the sensor data. This can be achieved by an energy-efficient decision making process between the battery-powered and mains powered nodes, with respect to optimal routes. The method must take into account many external factors inherent in an industrial environment, such as moving objects or

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unforeseen node failures. The talk will outline the main issues related with this research problem, together with the methodology selected for finding a solution.

Linlin Ke: Design and Implementing SABSA forensics Overlay - Developing Forensically Sound Application.

Sherwood Applied Business Security Architecture (SABSA) is a methodology originally designed for developing risk-driven enterprise information security architectures and also delivering security infrastructure solutions that support critical business initiatives. [1] [2] SABSA has been adopted in many private or public organisations including commercial, industrial, governmental, military and charitable groups. SABSA can act as a framework for software development in order to guide software security. Recent research shows that the SABSA framework appears very flexible when combined with other IT standards [3] [4] [5]. The core value of the SABSA methodology is represented through two SABSA matrices. Within these two matrices, essential roles and activities of system architecture are organized in an order corresponding to system development lifecycle. In our research, we will utilize these two properties of SABSA and take existing forensics best practises and produce a SABSA based forensics overlay and test its usefulness.

Ben McDonald: Automating the Layout of Media for Large, Shared Displays.

Advancements in technology are enabling larger computer displays at lower costs. Large screens can be found in many places such as airports, malls and public squares. Currently, information displayed on large screens is static or only changes based on scripted behaviour independent of the audience. Our research investigates how media layouts can be made adaptive to the positions of the audience members and their expressed interests. I will present the results of our investigation into the human and system factors involved in media layout for large, shared displays.

Ahmed Qaisi: Network Forensics and Log Files Analysis: A Novel Approach to Building a Digital Evidence Bag and Its Own Processing Tool.

Intrusion Detection Systems (IDS), are deployed to monitor networks and any observations are transmitted to destinations such as databases or log files. When digital evidence is needed, forensic specialists are required to analyse a very large amount of data. Even though forensic tools can be utilised, some of the process must be done manually, consuming time and resources. In our research, we aim to address this issue by combining several existing tools to archive the original IDS data into a new container, which is held in a database that has a structure based upon standard forensic processes. This proposed database functions as a Digital Evidence Bag (DEB) that will be optimised for future forensic analysis. The primary aim of the research is to develop a method to improve upon current IDS database storage in a forensic manner. A secondary aim of this research is to develop a new monitoring scheme in order to provide the necessary evidence to prove that an attacker has surveyed the network prior to the attack. A tool will be designed to collect the data from several IDS databases and forensically structure it.

Chiang Tay: A Robust Image Analysis System for Biopsy Tissue Image.

Biopsy is a medical test that removes a section of tissue from living subject and examines the tissue section to determine if it is abnormal. This is usually a manual and time consuming process for a doctor to extract the information from a tissue image. Image processing for automatic cell segmentation and analysis is one of the solutions to address this issue. However due to the complexity of the cells' shape and random noise on the image, it is extremely hard and challenging to perform

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an automate analysis with the computer. Moreover, tissue sections from different part of bodies have different characteristics. In order words, previous researches from other literatures only develop methods for specific tissue type. Therefore, a reliable automate image analysis system is required for the increasing needs in the medical aspect.

Russell Tomes: Managing Security and Quality of Service Performance on IEEE 802.11n Wireless LANs.

Understanding the performance characteristics resulting from multiple communication standards is crucial in managing optimal performance in relation to operational policy requirements. The interaction of basic wireless communication standards (IEEE 802.11), and Security (802.11i), Quality of Service (802.11e) and Authentication (802.1x) when operated on different platforms, platform architectures and network configurations is of significant interest to network managers. Major developments have occurred in basic wireless LAN throughput as a result of the evolution of 802.11a/b/g/n, as well as recent adjunct standards for Security, Quality of Service and Authentication. Further, the combination of these standards can be used to create an infrastructure which can be implemented on different operating system platforms, including Windows and Linux. This paper describes the performance analysis resulting from the implementation of a test-bed based upon 802.11n and operating in conjunction with 802.11i, 802.11e-based applications over a variety of operating systems, and under a variety of traffic loads and authentication mechanisms.

Janina Voigt: Improving OO with software contracts.

Today, object oriented programming (OOP) is the most commonly used programming paradigm and the state of the art of programming. Nevertheless, there are a number of issues surrounding OOP, including confusing encapsulation boundaries and weak encapsulation caused by object aliasing. We look at how the application of software contracts to OOP can help address some of these issues.

Dominic Winkler: Improving the efficiency of selecting and manipulating items across multiple contexts.

Selecting multiple items and then manipulating them is a common interaction used by millions of computer users several times a day. Copy-and-paste operations are one example of this generic select-manipulation interaction. Existing copy-and-paste techniques, however, are limited in particular when copying items across multiple contexts such as a series of different folders. This Master's research is focusing on improving the user interface used to support the selection and manipulation of multiple items. We propose a new multiple selection copy-and-paste technique, called Bag and Dump, that allows the user to copy-and-paste multiple items across different contexts. Bag and Dump not only significantly reduces the mouse movement from a path of $2n-1$ nodes to n , it also gives constant visual feedback to minimise cognitive complexity. We will evaluate this new technique to compare its efficiency with current techniques.

Tobias Wulff: Mitigation of Malicious Traffic in SIP-based VoIP Applications in a Broadband Internet Environment.

Voice Over IP (VoIP) telephony is becoming widespread, and is often integrated into computer networks. Because of this, it is likely that malicious software will threaten VoIP systems the same way traditional computer systems have been attacked by viruses, worms, and other automated agents. While most users have become familiar with email spam and viruses in email attachments, currently spam and malicious traffic over telephony is a relatively unknown threat. VoIP networks are a challenge to secure against such malware as much of the network intelligence is focused on the



Tait Electronics Ltd was formed in 1969 and is a leading provider of radio communications equipment to 160 countries. The company's global headquarters is in Christchurch, New Zealand, and its research and development operation is one of the largest in its sector in Australasia. Tait employs about 800 people in New Zealand and in its wholly-owned customer service operations in Australia, Singapore, Thailand, China, United Kingdom, France, Germany, Canada and the United States. Tait exports more than 90% of its products, with customers ranging from small private businesses to large multi-national corporations, government agencies, emergency services, network providers and specialist communications agencies.

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edge devices and access environment. A novel security architecture is being developed which improves the security of a large VoIP network with many inexperienced users, such as non-IT office workers or telecommunication service customers. The new architecture establishes interaction between the VoIP backend and the end users, thus providing information about ongoing and unknown attacks to all users. An evaluation of the effectiveness and performance of different implementations of this architecture is done using virtual machines to emulate vulnerable clients and servers, through providing apparent attack vectors.

Chunhui Zheng: Vision-based Navigation Assistant For Robotic Wheelchair In Indoor Environment.

The project attempts to develop robust vision-based navigation assistant through doorways and hallways where static and dynamic objects are present. This project has several objectives: 1) develop robust methods for indoor feature recognition and object segmentation. This includes ground plane detection, doorway and hallway detection, step and drop-off detection, ramp detection, static object segmentation and dynamic object recognition. 2) Calculating motion information of wheelchair and dynamic objects. 3) Mapping 2D models of rooms for positional orientation and certainty measurement. We proposed a method by fusion of color feature, edge map, motion analysis and stereo vision to help the system interpret the visual cues.

PhD students

Mohammed Algarni: Morphology and Arabic Information Retrieval.

Arabic Information Retrieval (AIR) on the Internet is way below the acceptable level in terms of both precision and relevance. Google for instance, does not have the means to classify query words; it treats Arabic words as strings of unrelated sequence. It is fair to say that all search engines on the internet do not use Arabic morphology. Furthermore, Arabic morphology has not been studied and documented thoroughly with relation to Information Retrieval. In this study, we intend to test the effectiveness of Arabic morphology on Information Retrieval.

Muhammad Asad Arfeen: Online Performance Evaluation of Future Internet and its Applications.

This PhD research project will contribute to forming a scientific basis for Internet measurements specifically targeted at online performance analysis & optimization of Future Internet environments such as Cloud Computing which is expected to gain a prominent profile in the nearest future. The inspiration for this PhD research project came from the fact that network topology and traffic considerations along with dynamic user requirements will play a dominant role in determining future Internet application architectures and protocols, for e.g. resource allocation problems in Cloud Computing. There has been a lot of research work on the analysis of networks/Internet from the point of view of data traffic and security management and various networking resource allocation algorithms have been proposed. Given the fact that resources on the Internet are (and will be) always limited and traffic is going to increase unbounded, there is a growing opinion that performance of Internet architectures should be evaluated online, so as to make Internet more reactive and responsive to new applications which will be more traffic intensive as well as delay sensitive, for e.g. public usage of cloud computing. This PhD research will focus on proposing new solutions for reliable active measurements aimed at capturing global Internet behaviour online and to investigate to what extent global Internet performance parameters are predictable. These reliable and predictable metrics and their online collection and analysis

methodologies can further be used to fine tune or optimize existing and future global Internet applications. Based on topological changes, routing asymmetries and packet losses, it is also possible that active measurements may give misleading results about current network conditions, so online identification of inaccurate measurements is necessary. If a wrong online control decision (e.g. resource allocation) has been made on the basis of inaccurate measurements, then the associated cost or overhead of corresponding impact is needed to be quantified, to assess possible adjustment (e.g. reallocation of resource) and later on offline analysis to make measurement collection and analysis methodology robust to inaccurate active measurements. Also more importantly, limits on the accuracy of active measurements will need to be investigated so that they can be credible. This project will also involve revising the analytical models, to accommodate performance of services offered by new Internet services and carry out experiments and measurements, to compare the applicability of the earlier works done on Web and Grid computing. The activities planned for achieving the final goal of this research project may require additional work on sequential estimators, for ensuring that the results of active measurements will be sufficiently accurate, i.e. will have small statistical errors.

Philip Buchanan: Modifying Visual Style Using Characteristic Proportions.

This presentation showcases 'characteristic proportions', a method that contributes toward the ultimate goal of replicating visual style. Artists often draw the same objects in different ways, and one of the major differences is in the proportions of the shapes within the image. This presentation talks about how these proportions can be measured; how they can be used to classify the visual style of objects; and how they can be used to change the style completely.

Jaco Fourie: The Blind Deconvolution of Binary Images Using Harmony Search.

Image deconvolution or deblurring is the process of recovering an image that has been corrupted by image blur. Common causes of image blur include the camera being out of focus or camera motion during exposure. The primary aim of deconvolution is the recovery of the image and when the point spread function (psf) can be accurately estimated beforehand, deconvolution is made much simpler. This is known as non-blind deconvolution as opposed to blind deconvolution when the psf cannot be estimated beforehand and must be discovered simultaneously with the recovery of the image. Blind deconvolution is a much more difficult problem and perfect recovery of the image is rare, especially when the image is also corrupted by large amounts of noise. We introduce a novel algorithm called Largest Error First Harmony Search (LEFHS) that is able to recover binary images to 100% accuracy even when severely degraded by noise and blurring.

Mofassir Haque: Challenges to Future Internet Design.

Internet was primarily designed for sharing research work between institutions located thousands of miles apart. At that time, no one could perceive the growth rate of Internet in coming years. Currently, there are an estimated 2 billion users of internet worldwide and the figure continues to grow. Present Internet architecture cannot keep pace with this phenomenal growth and there is a dire need to immediately address major problems such as security, scalability, ubiquitous devices connectivity, availability and network management. A number of solutions like Network Address Translation, Internet Protocol Version 6, Secure Internet Protocol etc. have been adopted which have been able to temporarily solve these problems. However, this approach has resulted in further weakening of the current Internet architecture. The term 'Future Internet' has been recently coined by researchers for the perceived

engagements are helping us achieve this, and create the vibrant company that makes Jade a great place to work. Standing behind the Jade brand are our people. The Jade team has more than 350 members, working throughout North America, Europe, Asia the Middle East and Pacific. It is a recognised market leader in the logistics line of business, with successful implementations of port container management and train rail control systems in every continent. The Ports management system operates extensively in New Zealand and Australia along with Italy, Abu Dhabi and has recently been deployed in Iraq and Norway. In the area of Investigations and Intelligence is the award-winning solution, Investigator. Investigator has been deployed in 29 countries and 6 languages and is used by the world's leading police forces, intelligence agencies and companies for monitoring terrorist activities, protecting witnesses, investigating crime and corruption, protecting borders and keeping the Olympics drug free. Supporting these products is Jade's high performance technology. The latest development is JOOB, a next-generation, .NET data storage solution which was launched to prototype testing last month and will be available in November. The future for Jade is bright and Canterbury offers the perfect base for growth - local Universities with world class graduates, a rich industry support network and worldwide links create the perfect incubation for success. We have the passion, the people and high performance technologies and the emerging mobile and virtual space offers an exciting field to be playing in!
<http://www.jadeworld.com>



Microsoft New Zealand is heavily involved in supporting local student innovation. The Microsoft Imagine Cup is a technology competition that help to inspiring students to bring their ideas to life by supporting them with industry and Microsoft Mentors. The programme is available to all students each year. In addition to this Microsoft also provides access to all creative tools for free to students to help them develop their skills and take part in this competition. You can find out more information from: www.imaginecup.co.nz



Orion Health's 330 (and expanding) employees supply technology and services to over 1100 clients worldwide. Orion Health is a leading provider of clinical workflow and integration technology for the healthcare sector. Orion Health's clinical information software meets the information needs of clinical staff and healthcare managers, delivering secure, universal access to healthcare information and helping healthcare providers proactively manage and coordinate patient care across the community. Orion Health's integration and messaging products streamline the exchange of healthcare data within organisations and between business partners. Integrating healthcare systems throughout the world since 1993, Orion Health contributes to integration and clinical workflow projects across the globe for clients including Abbott Laboratories, New York State Department of Health, Capital Health, New South Wales Health, and the New Zealand Ministry of Health. Orion Health has offices in the United States, Canada, United Kingdom, Spain, Australia and New Zealand, and our growing network of partners includes leaders in technology and services such as Oracle Corporation, LogicaCMG, Sierra Systems, Sun Microsystems, Philips Medical Systems, Hewlett-Packard and IBM. Further information including a video featuring staff in our Auckland office can be found at www.orionhealth.com



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As one of the world's leading producers of computer networking equipment, the group employs more than 3000 people worldwide.

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The success of Allied Telesis Labs is built on the skills of our talented employees, who enable the company to compete on an equal footing with the world's largest communications and networking equipment manufacturers.

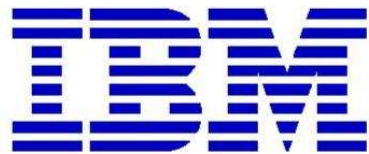
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The Christchurch City Council is one of the South Island's largest employers - a progressive local authority, responsible for ensuring the continued successful growth and development of one of New Zealand's greatest cities.

More than 2300 staff work for the Council across 60 locations around the city and Banks Peninsula. These include professional and administrative positions in core infrastructural areas such as water, waste, roading and parks; as well as jobs within the Council's broader activities including its library network, art gallery and recreation facilities.

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JADE™

Jade is a leading global product innovator with over 30 years' experience. Everyday we move Europe's trains, control the world's ports, manage financial institutions and help solve complex crimes for some of world's most respected police forces. We grew up as a leading edge technology innovator and today some of the world's best known companies trust us with their reputations. They view Jade as a source of their own innovation and ask us to design solutions to realise their greatest opportunities. Our ideas are inspired by a deep understanding of our customers' needs. Jade's design methods, development capability and high performance technology allow us to translate concepts into prototypes and develop solutions for customers quickly. Our collaborative approach and human centred design process is a key tool that sets us apart. We work with partners all over the globe and are quickly adapting an open innovative work environment, to foster the sharing of expertise and encourage creative thinking. We encourage this innovation at Jade everyday. Social media activates and staff

internet architecture after fifteen years . 'Future Internet Program' under EU 7th Framework and USA 'FIND' Program are the two major initiatives towards the designing of new architecture from clean slate. This presentation will discuss challenges to current Internet and perceived architecture for Future Internet.

Mashitoh Hashim: New Algorithms and Data Structures for Solving the All-pairs Shortest-path Problem.

In this seminar, we will present new algorithms and data structures for computing shortest paths in a complete directed graph. Results indicate that the two recently introduced algorithms are smoother and easier to implement than the previous algorithm that gives the expected running time in $O(n^2 \log n)$.

Moffat Mathews: Multiple, adaptable pedagogical strategies in Intelligent Tutoring Systems.

Expert human teachers have at their disposal a number of teaching strategies. One way they adapt to the student (in learning scenarios with low teacher-to-student ratios) is by choosing and employing a particular teaching strategy. This adaptation depends on the situation, which consists of a number of factors such as the student's expertise, previous interactions with the student, a preferred pedagogy, and the task at hand. Adaptation in current Intelligent Tutoring Systems is not done at the level of teaching strategies as developing multiple teaching strategies per situation is a difficult task. The difficulty is compounded when implementing the processes to choose the most appropriate strategy for any given situation. In this project, we explore the possibility of creating a pedagogical framework for multiple, adaptable pedagogical strategies in Intelligent Tutoring Systems.

Mohammad Obaid: Facial Expression Representations and Animation using Quadratic Deformation Models.

Mohammad will talk about a new way of representing facial expressions using quadratic deformation models, and how we can represent expressions to be used in different application areas, such as cartoons, 3D characters, and expression recognition.

Kapila Pahalawatta: Adaptive Histogram Particle Segmentation and Classification.

This study proposes an adaptive histogram particle segmentation algorithm to classify airborne nano-scale particles which prior research has been unable to do. To capture the both Mie and Rayleigh scattered light by these tiny particles, a short wavelength light source at the end of the visible spectrum or beyond (ultra violet and/or blue) is proposed. To isolate moving particles, an adaptive particle based segmentation algorithm is introduced. Both static and dynamic attributes of particles are extracted and particles are classified with these attributes.

Sayan Ray: A Fast and Simple Scheme for Mobile Station-Controlled Handover in Mobile WiMAX Networks.

The IEEE 802.16 (WiMAX) technology, both in its IEEE 802.16d (Fixed WiMAX) and IEEE 802.16e (Mobile WiMAX) versions, is regarded as a very promising broadband access technology for the next-generation broadband Wireless Metropolitan Area Networks (WMANs). The introduction of mobility management framework in the WiMAX family of standards has set this technology as a strong contender for existing and forthcoming networks, in terms of providing ubiquitous computing solutions for multimedia applications. Our work is focussed towards hard handover related research in IEEE 802.16e (Mobile WiMAX) technology. Related research works have

shown that the hard handover scheme suffers from excessive scanning related drawbacks, which accounts to almost 50% of the overall handover latency in Mobile WiMAX. Recently proposed modifications of the traditional Mobile WiMAX handover scheme are mostly Base Station (BS)-controlled and Mobile Station (MS)-assisted. However, in case of a mobility scenario where the BSs are fixed, from perspective of scalability, it would be more appropriate to have a handover scheme that is fully MS-controlled. Our current research work proposed a fast handover procedure, with much less scanning activities, in which, depending on the received signal strengths from the different neighbouring BSs (NBS), an MS could self-track its own mobility pattern relative to these NBSs and thus could select well in advance the particular target BS (TBS) it is going to handover with. Simulation studies have shown fairly reduced HO latency in comparison to the traditional Mobile WiMAX handover framework. This talk would give an overview of the proposed scheme along with some simulation results.

Tipawan Silwattananusarn: An Investigation of Classifying Species and Function of Thai-Herbs using DNA sequences.

DNA sequences determine species, characteristics, and functions of organisms but the structures contain very long sequences that include repetition, noise and junk. This structure can affect the DNA sequence classification. The proposed research focuses on extracting features from DNA. It does that by transforming a long DNA sequence into a hierarchical grammar of important subsequences and looks at the possibility of classifying DNA using these features. This will improve the performance over existing classification approaches. In this talk, an idea of the research framework along with the preliminary experimental results will be presented.

Ehsan Tabatabaei Yazdi: Adaptive Resource Allocation for mobile Body Sensor Networks.

One of the main problems faced by wireless networks is the fact that they need to share and use the same medium for communicating. To rectify the interference occurring in this condition, researchers have proposed different ways to address this problem. The main target of this talk is to investigate ways of improving the connectivity and QoS of Wireless Body Sensor Network (WBSN) nodes.

Mohammed Thaher: An efficient algorithm for the kth maximum convex sums.

Finding the most useful informative array portion is considered a challenging problem, which firstly evolved in 1977. Since the Maximum Subarray Problem (MSP) emerged as a problem in pattern recognition, subsequent developments took place in relation to MSP algorithms and computation. The current model that we developed improves MSP results by using the concept of maximum convex sums (MCS). This approach presents efficient methods for computing the maximum convex sum in a given array. In this research we firstly achieved an efficient algorithm that determines the boundaries of a convex shape to calculate the optimal gain. The time complexity of this algorithm is the same as that for other existing algorithms, such as Kadane's algorithm. Moreover, despite the complicated processes involved in this algorithm, it returns the shape of the optimised solution. Secondly, a generalization of the derived efficient algorithm is also presented. This algorithm finds the first maximum sum, second maximum sum and up to the kth maximum sum by using the disjoint technique.

Susanne Tak: Your windows through my eyes - a longitudinal study of window use.

Since many years, windows are the main entity with which users interact with computer applications. However, empirical studies of how people

organise windows on the screen and how they use different windows switching tools are rare. We present a longitudinal study of how people interact with windows. In this study the window use, including window management and switching between windows, of 25 participants was logged over a period of approximately three weeks.

Amali Weerasinghe: Developing a General Model for Supporting Tutorial dialogues in Intelligent Tutoring Systems.

Researchers have long been interested in tutorial dialogues as they are considered to be one of the critical factors contributing to the effectiveness of human one-on-one tutoring. We present a project that aims to develop a general model for supporting tutorial dialogues that could be used in both ill-defined and well-defined instructional tasks. In this talk we will discuss how we evaluated the effectiveness of the model in supporting dialogues in databases design. EER-Tutor, a database design tutor was enhanced to facilitate adaptive tutorial dialogues. The control group participants received non-adaptive dialogues regardless of their knowledge level and explanation skills. The experimental group participants received adaptive dialogues that were customised based on their student models. The performance on pre- and post-tests indicated that the experimental group participants learned significantly more than their peers.

Thomas Young: A brief review of recent research in Evolutionary Development.

Optimisation of dynamic systems where the goal varies with time; simulations of complex systems where the rules aren't entirely clear. What can be done? Recast these problems into the language of biology and a possible approach becomes clear. There is now a good body of research in biology on the intersection of evolution ("optimisation of dynamic systems...") and developmental biology ("simulations of complex systems...") that can inform computer science research in simulation and optimisation. In this short talk I plan to present a brief summary of this newer research and explain its relevance to my thesis topic in optimisation.

NOTES FOR SPEAKERS

1. Please keep your presentation to the allocated time of 15 minutes.
2. Five minutes is allowed for discussion after your talk.
3. Speakers with PowerPoint slides - It is your responsibility to load them into the computer before your session begins.
4. A computer and data projector will be available. Please load your presentations onto it before the start of your session.

Prizes will be awarded for the

- best PhD student talk
- best Masters student talk
- best Honours student talk