



Department of Computer Science and Software Engineering

2016 Departmental Postgraduate Conference

September 1-2, 2016

Lecture Theatre 031, Erskine Building

Principal Sponsor



Also sponsored by:



Thursday 1st September (Erskine room 031)

9:00	Coffee/Tea/Orange Juice and nibbles <i>upstairs in the level 2 tea room</i>
-------------	--

Session 1 – Welcome/CS Honours

Session Chair: Prof Andy Cockburn

9:45	Welcome: Assoc Prof Austen Rainer Keynote Speaker: Peter France (Trimble)
10:15	Andrew Bell. Mary Had a Little Lambda – Implementing a Minimal Lisp for Assisting with Education
10:30	Guillaume Payet. Real-time Simulation and Rendering of Massive Crowds on the GPU
10:45	Aaron Stockdill. Neuromorphic Computing with Reservoir Neural Networks on Memristive Hardware
11:00	<i>MORNING REFRESHMENTS upstairs in the level 2 tea room</i>
11.30	Edward Armstrong. Use of Metrics and their Visualisations in Software Engineering Projects

Session 2 – Masters

Session Chair: Dr Walter Guttman

11:45	Johnny Huang. Enabling Proxemics Interactions for Huge Public Displays
12:00	Hayden Jackson. The Artificial Brain and the Power of Timing
12:15	Boney Bun. Software Calibration for Air Quality Egg Version 2
12:30	Zane Barker. Unmanned Aerial Vehicle Based Wireless Location Technology for Search and Rescue
12:45	<i>LUNCH upstairs in the level 2 tea room</i>

Session 3 – PhD

Session Chair: Dr Kouros Neshatian

1:50	Perna Singh. Diagnosis of Ultrasound Images using Neutrosophic Gaussian Filtering model with Neuro Fuzzy C- Mean and Level Set
2:10	Kashif Amanullah. Computer Science Education in Schools
2:30	Matthew Ruffell. A Look at Potential Interesting Topics In Cyber Security
2:50	Ashley Williams. Evaluating the Quality of Software Practitioners' opinions using Natural Language Processing Techniques

Friday 2nd September (Erskine room 031)

Session 4 – PhD

Session Chair: Assoc. Prof. Austen Rainer

10:00	MORNING REFRESHMENTS upstairs in the level 2 tea room
10:40	Keynote Speaker: Dr Nathan Robinson (Telogis) Route Optimisation and Road Network Routing at Telogis
11:00	Tieta Putri. Artistic Style Characterization using Brush Stroke Analysis for Painterly Non-Photorealistic Rendering Applications
11:20	Andrew Curtis-Black. An Enterprise Policy Description Framework for Software-Defined Networking
11:40	Joshua Leung. Noticeable but not Distracting – Characterising Highlighting Techniques
12:00	Mengmeng Ge. Security Analysis of Software-Defined Internet of Things
12:20	LUNCH upstairs in the level 2 tea room

Session 5 – PhD

Session Chair: Thomas Young

1:10	Shinichi Yamada. Hyperplane and Hyposphere Models in Support Vector Machines
1:30	Joshua McCulloch. Modelling overhead utility networks using LIDAR in order to predict network behaviour and outages
1:50	Geela Fabric. Developing and Evaluating Activities for Increasing Engagement and Maximising Learning in a Mobile Programming Tutor
2:10	Alan Shangguan. Video Based Motion Capture in Environments with Non-stationary Background
2:30	AFTERNOON REFRESHMENTS upstairs in the level 2 tea room

Session 6 – PhD

Session Chair: Prof. Tim Bell

3:15	Simon Yusuf. Security Modelling and Analysis of Dynamic Enterprise Networks
3:35	Enos Chen. Do Erroneous Examples Improve Learning in Addition to Problem Solving and Worked Examples?
4:00	Social gathering/Awards Ceremony in the Staff Club Location: www.staffclub.canterbury.ac.nz/contact.shtml

Abstracts

Keynote Speakers

Peter France

Peter France originally did a BSc in COSC here at UC and now leads an innovation research team in a joint venture with Trimble and Caterpillar.

Research in Trimble

Decades ago, Trimble developed positioning systems including GPS, laser, and optical technologies. Since then, the company has expanded into new markets and developed software solutions to provide enterprise-level productivity gains for customers. Trimble has employees in more than 30 countries, including a significant research presence here in Christchurch. This talk will focus on examples of innovative technologies recently investigated, and the relationship between industry and academia.

Dr Nathan Robinson

Dr Nathan Robinson is a Senior Software Engineer in the Road Network Routing team. Prior to working at Telogis he was a postdoctoral researcher and teaching staff member at the Australian National University and the University of Toronto. He has a PhD in artificial intelligence from NICTA and Griffith University and a Bachelor of Computer Systems Engineering from Griffith University.

Route Optimisation and Road Network Routing at Telogis

Vehicle routing is the process of finding a path along the road network that a vehicle can travel to take it from one location to another. At Telogis we compute millions of routes a day on both low-power mobile phones and high-power clusters of servers. The routes we produce need to take into account the realities of a messy driving environment: there are rules about when to turn, bridges that are too low to be driven under, and the fact that traffic can change and roads can close. This talk will provide an overview of what routing in the real world is like and how we solve these challenges.

CS Honours

Edward Armstrong. Use of Metrics and their Visualisations in Software Engineering Projects.

In this paper, we describe an observational investigation that explores whether creating visualisation systems using software metrics promotes reflection. We presented metric visualisations to six groups, in separate sessions, from an undergraduate software engineering project course, each consisting of 7-8 students. The results and feedback from these sessions were used to build upon the visualisation system to improve them. When the students viewed the visualisations based upon their own projects, some reflection occurred but much of the information conveyed was already known by the groups. However knowing the level of reflection and interaction in this portion allowed for comparison when the groups were shown other groups' visualisations. Feedback and recorded statements from the students showed that the students reflected but were primarily focused on performance in their course. Delayed questions to the groups showed that the engagement was increased in all groups. It was found that for the visualisations to be of use to the students they must provide direct information about

the students' code base, such as telling students where to look to find possible faults. This should be have an explanation for the reasoning and actions to take because of the information.

Andrew Bell. Mary had a Little Lambda – Implementing a Minimal Lisp for Assisting with Education.

We describe the implementation of a minimal version of Lisp for use in teaching programmers who have some experience in another language. We discuss the reasons why learning Lisp is beneficial, and what such a minimal language might achieve. We mention other Lisp dialects which are minimal, and why these do not meet the needs we identify. We then report on the implementation of a language, Mary, and the most important features of this dialect. This language is placed in the context of other research and we report on the extent to which Mary meets our design goals.

Guillaume Payet. Real-Time Simulation and Rendering of Massive Crowds on the GPU.

Crowd simulations are used to imitate the behaviour of a large group of people. Such simulations are used in industries ranging from video-games to public security. In recent years, research has turned to the parallel nature of GPUs to simulate the behaviour of individuals in a crowd in parallel. This allows for real time visualisation and interaction with massive crowds and/or their environment. The social forces algorithm is a crowd simulation method using a set of forces to compute each agent's motion. A GPU implementation of the social forces model as well as a parallel rendering system are presented here.

Aaron Stockdill. Neuromorphic Computing with Reservoir Neural Networks on Memristive Hardware.

Building an artificial brain is a goal as old as computer science. Neuromorphic computing takes this to a new level by attempting to simulate the human brain. In 2008 this goal received a new boost in the form of the memristor, a resistor that has state, and again in 2012 with the atomic switch, a related circuit component. We work towards simulating large networks of these devices, and exploring their applications in machine learning using reservoir neural networks. Restrictions imposed by physical laws upon circuits mean that neither the memristors nor atomic switches are capable of learning time-series sequences. This raises questions about using the reservoir computing paradigm for memristive hardware.

Masters

Boney Bun. Calibration for Air Quality Egg Version 2.

Compared to analysis instruments, low-cost environmental sensors encounter several challenges. Of all obstacles, we propose a system that could improve the low accuracy of the low-cost environmental sensors, particularly Air Quality Egg (AQE) version 2 in detecting NO₂ and CO. The system obtains the AQEs data from its server, detects and removes any outliers, and adjusts its output using a mathematical model obtained from one-month field data collection located side-by-side with the Environment Canterbury's analysis instruments. Linear regression, multi-linear regression, or neural network are the method candidates to develop the adjusting model. Time series analysis is likely to be applied as outlier detection algorithm. The proposed system will then be evaluated against instrument analysis for another one month. The work thus provides both a quantification model and an alternative means to calibrate sensors for practical applications.

Johnny Huang. Enabling Proxemics Interactions for Huge Public Displays.

In this research, we proposed an approach for enabling proxemics interactions for huge public displays by recognising human actions using Fourier Temporal Pyramid together with Support Vector machine and Multiple Kernel learning. The accuracy of our proposed method was 86% for recognising human actions in this proxemics context for huge public displays, compared with 80% for the best state-of-the-art method.

Hayden Jackson. The Artificial Brain and the Power of Timing.

The spiking neural network is a type of artificial neural network based upon biological understanding of the brain. These networks are commonly used to solve problems that have an important sequential or temporal element. Some classical learning algorithms have been adapted that allow these networks to solve classical classification problems such as the AND and XOR problem. These algorithms usually come with the restrictive requirements for the network, require extensive synaptic modification, and are biologically unrealistic. We have demonstrated that these methods are not required to solve such problems and can be done by simply observing the state of the network and learning which neurons best represent the desired outcome to the problem. We then discuss how this could be improved by network modifications and what parallels that it might draw to the human brain.

Zane Barker. Unmanned Aerial Vehicle Based Wireless Location Technology for Search and Rescue.

The goal of this research is to investigate and prove the feasibility of using an automated airborne platform to localise a wireless transmitter. This is targeted at search and rescue applications in disaster scenarios, under the premise that people are increasingly wearing or implanting wireless emitters which can be used to aid localisation, identification and triage.

PhD

Kashif Amanullah. Computer Science Education in Schools

Computer Science is a booming field and many countries have taken initiative to start teaching it from school level. Changes to curriculum have been made to include computing concepts like programming, algorithms, etc. Computer Science Field Guide (CSFG) is one such initiative which aims to teach computer science concepts to high school students. There are numerous challenges identified in research which need to be addressed to fully exploit the true potential of computer science education at school level. Accessibility is one such issue which limits the use of computer technology for people having various disabilities (blindness, dyslexia, etc.). Secondly, there is a need of innovative methods to teach complex computer science topics like programming, artificial intelligence, and many others. I will investigate these issues and try to identify gaps and potential research areas (as I am just starting my research) with CSFG being used as the case study.

Enos Chen. Do Erroneous Examples Improve Learning in Addition to Problem Solving and Worked Examples?

Learning from Problem Solving (PS), Worked Examples (WE) and Erroneous Examples (ErrEx) have all proven to be effective learning strategies. However, there is still no agreement on what kind of assistance (in terms of different learning activities) should be provided to students in Intelligent Tutoring Systems (ITSs) to optimize learning. A previous study (Shareghi Najar & Mitrovic, 2013) found that alternating worked examples and problem solving (AEP) was superior to using just one type of learning tasks. In this study, we compare AEP to a new instructional strategy which, in addition to PS and WEs, additionally offers erroneous examples to students. The results indicate that erroneous examples prepare students better for problem solving in comparison to worked examples. Explaining and correcting erroneous examples also leads to improved debugging and problem-solving skills.

Andrew Curtis-Black. An Enterprise Policy Description Framework for Software-Defined Networking.

Software-defined networking (SDN) is a new paradigm which allows us to program networks the same way we program computers. Imagine a future where networks can be upgraded like operating systems, and services can be added like smartphone apps. This technology will be particularly useful in the area of network management. Network management involves implementing rules like "don't let undergrads use more than 5GB of data per month", which we call "policies". Some policies change frequently, while others remain fixed. Thus networks are governed by an ever-shifting pool of interacting policies. Concepts such as policy reuse, composition, conflict, maintenance, update, asynchronous adoption and more are critical to understanding this landscape and advancing the state of the art. We aim to make it easier to write network-management applications by introducing new abstractions, optimising common procedures, and ultimately creating a policy framework for network management.

Geela Fabric. Developing and Evaluating Activities for Increasing Engagement and Maximising Learning in a Mobile Programming Tutor.

PyKinetic is a tutor developed for Android smartphones, aimed to serve as an additional resource for novice learners to enhance their Python 3 programming skills. The tutor currently contains different types of Parson's problems – a puzzle that presents a code snippet composed of randomised lines of code which requires the learners to rearrange it in its correct order given

the code output. We have evaluated the tutor in a small pilot study with novices and experts. We have received positive feedback for PyKinetic and interesting strategies were revealed from both groups. As expected, the study revealed that experts outperformed novice users and used superior problem-solving strategies. More recently we have conducted a full evaluation of PyKinetic with volunteers from COSC121. Initial analyses from the full evaluation will be presented. In the next month, we plan to repeat the study with different sets of students.

Mengmeng Ge. Security Analysis of Software-Defined Internet of Things.

The Internet of Things (IoT) is supposed to contain millions or billions of objects which will communicate with each other and with other entities (e.g., human beings). The large number of heterogeneous devices offers people convenience but also brings a variety of known and unknown vulnerabilities. It is our best interest to remove all the identified vulnerabilities (e.g., patching software vulnerabilities), but it is infeasible to do so when taking into account the time, effort and cost. Moreover, unknown vulnerabilities (e.g., zero-day vulnerabilities) are impossible to patch, and forever-day vulnerabilities (e.g., vendors and suppliers no longer provide support for their products) are difficult to remove. In our research, in order to deal with non-patchable vulnerabilities, we will change the attack surface of the IoT to increase the attack efforts. As software-defined networking (SDN) is able to manage large-scale networks, establish complex routing topologies and simplify user operations, it is foreseen as a key enabler for the IoT. Thus, we use software-defined sensor networks in the IoT scenarios (e.g., smart office, smart home) and analyze how reconfiguration capabilities of SDN can improve the security of the networks via model-based evaluation. We designed two defense mechanisms to reconfigure the network topology based on the types of sensor nodes (with patchable or non-patchable vulnerabilities), carried out security analysis in the simulation and got some preliminary results.

Joshua Leung. Noticeable but not Distracting -- Characterising Highlighting Techniques.

Highlighting techniques are extensively used in user interfaces to make users aware of salient information in a timely manner. Example uses include alerting users to missed events (e.g. a missed Skype call), pending actions (e.g. an unread message or software updates to install), or time critical actions (e.g. an incoming call). However, there is still a lack of understanding about the relative tradeoffs between noticeability and distraction, and how highlighting techniques can be controlled to manipulate these effects. This presentation will summarise our work on developing a method to measure these effects, and what the findings reveal about some commonly used highlighting techniques.

Joshua McCulloch. Modelling overhead utility networks using LIDAR in order to predict network behaviour and outages

Once installed, a wooden utility pole can expect to have a working lifetime of 50 years. As expected it can be near impossible to predict energy demands over such time spans. In the past the capacity of any stretch of the network could be increased by running additional conductors along it. The maximum capacity of these conductors is estimated by taking into account the local climate, characteristics of the conductor, and configuration of the installation. Once installed these estimations generally have remained fixed. In our research we are building detailed 3D models of the overhead utility networks in order to dynamically rate the capacity of individual conductors. By recovering an accurate representation of the conductor's physical characteristics, and combining this with local weather and line loading, the sag of the line can be predicted in real time; allowing for the conductor to be loaded much closer to its theoretical capacity.

Tieta Putri. Artistic Style Characterization using Brush Stroke Analysis for Painterly Non-Photorealistic Rendering Applications.

Painterly non-photorealistic rendering (NPR) is an active research in image processing area which aims to incorporate expressive and stylistic qualities in the output. For the style-oriented stroke-based application of painterly NPR, it is essential to have robust methods for capturing, representing and remapping artistic styles. Those processes are done through the extraction of brush stroke parameters from artworks with distinguishable artistic style. In this presentation, we provide an outline of important methods used for brush stroke region extraction, and present our results using Van Gogh's paintings which have a unique brush stroke characteristic of being bold and repetitive with a high-level of object abstraction.

Matthew Ruffell. A Look at Potential Interesting Topics in Cyber Security.

Since I have just started my PhD on August 1st, this talk will be a short summary of a few interesting projects that could potentially become my main field of research in cyber security. Topics discussed will include: Using off the shelf embedded systems to attain state actor capabilities, symbolic execution of operating system kernels to discover complex vulnerabilities, and advanced reverse engineering and malware analysis.

Huyuan Shangguan. Video Based Motion Capture in Environments with Non-Stationary Background.

Several methods for capturing motion data from single video have been reported in computer vision literature, and most of them deal with stationary background. The problem becomes more complex and challenging in a moving scene where traditional background subtraction algorithms often fail. We require robust algorithms for marker-less tracking of human body's movements and for extracting motion information from them. This presentation gives an outline of some recent research work done in the area of video based 3D motion capture through markerless tracking, learning and detection algorithms.

Prerna Singh. Diagnosis of Ultrasound Images using Neutrosophic Gaussian Filtering model with Neuro Fuzzy C- Mean and Level Set.

Speckle noise is inherent in ultrasound images and degrades the quality of information contained in them. Neutrosophic Gaussian filtering which is based on Gaussian distribution in neutrosophic domain is proposed to reduce the speckle noise from ultrasound images. The ultrasound image is transformed into NS domain to perform TV- regularization where the filtering process is applied to reduce image indeterminacy. The proposed technique will preserve valuable information such as texture for better diagnosis using ultrasound images. A neuro fuzzy C- means and level set (NFCMLS) method is also proposed for segmentation of objects found in the image.

Ashley Williams. Evaluating the Quality of Software Practitioners' Opinions Using Natural Language Processing Techniques.

Practitioners are used as a source of evidence in software engineering research, e.g. surveys, interviews and observations. This research looks at an alternative source of evidence i.e. documents produced by practitioners, such as a blogs. The research will seek to identify the 'better quality' document e.g. blogs that contain reasons and evidence to support a practitioner opinion. These 'better quality' documents are hypothesised to provide a valuable alternative to traditional sources of data.

This research will identify, evaluate and apply techniques from various natural language processing disciplines to analyze the content of practitioners' documents to identify the 'better

quality' documents, producing corpora of datasets with varying degrees of quality. The research will then go on to evaluate how useful these corpora are for future research by others.

Shinichi Yamada. Hyperplane and Hypersphere Models in Support Vector Machines.

We formulate a model of Support Vector Machines which seeks for the minimum of the enclosing balls as well as the maximum of the margin. With this formulation the optimal weights of the kernels in the Multiple Kernel Learning can be solved analytically without additional constraints. The experimental results show that the proposed method surpasses the state-of-the art and has promising possibilities.

Simon Yusuf. Security Modelling and Analysis of Dynamic Enterprise Networks.

Dynamic networks can be characterised by many factors such as changes (e.g., host addition and removal, vulnerability change, update of applications and services, topology changes). It is of vital importance to assess the security of such dynamic networks in order to improve the security. However, existing graphical security models (e.g., attack graphs and attack tree) have considered static networks i.e. the network does not change). It is also unclear how the existing cyber security metrics (e.g., attack cost, attack shortest path) change when the network configuration changes over time. To address this problem, we propose (i) to develop a graphical security model named T-HARM (Temporal-Hierarchical Attack Representation Model) to capture security changes and (ii) investigate the effect of existing cyber security metrics based on the proposed security model. We only consider the changes of vulnerabilities on the hosts. Finally, we present and discuss the results of our simulation.

The organisers are grateful for the support of the following sponsors:



Principal Sponsor

Telogis is a global, cloud-based Mobile Enterprise Management (MEM) software company that connects the vehicles, people and the work that's being done outside the four walls of its customers' businesses.

Once connected, the Telogis MEM platform optimizes and automates business processes to drive safety, productivity and efficiency. Telogis also builds its technologies into vehicles and equipment from leading manufacturers including Ford, GM, Hino, Isuzu, Mack, Volvo and Manitowoc Cranes, eliminating the need for hardware installations, and its strategic partnerships with Apple and Element deliver opportunities to improve every aspect of your technology deployment and implementation.

The R & D team in Christchurch is growing rapidly and Telogis is always looking for top talent. Offering a fantastic working environment, alongside some of the brightest minds in the industry. If you're interested in finding out more about the limitless opportunities at Telogis, email nicki.graf@telogis.com or visit careers.telogis.com

Telogis A career that makes you think... careers.telogis.com



Allied Telesis: For nearly 30 years, Allied Telesis has been delivering reliable, intelligent connectivity for everything from enterprise organizations to complex, critical infrastructure projects around the globe.

Allied Telesis is recognized for innovating the way in which services and applications are delivered and managed, resulting in increased value and lower operating costs.

Originally part of the DSIR, Allied Telesis Labs - based in Christchurch, New Zealand - joined the international Allied Telesis Group in 1999, and is now the largest research and development centre for the group.

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

Allied Telesis smart technologies, such as Allied Telesis Management Framework™ (AMF) and Enterprise SDN, drive network evolution, and deliver efficient and secure solutions for people, organizations, and “things”.

More than one million customers worldwide have chosen our technology for their networks.

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.

www.alliedtelesis.co.nz



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 works 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.

The Christchurch City Council is an organisation committed to achieving sustainable outcomes for the community, environment and people of Christchurch and Banks Peninsula. By working for the Christchurch City Council you will have an opportunity to work on a wide range of projects providing you with opportunities to further develop your breadth of skills whilst contributing toward the development of our beautiful city and surrounding areas.

<http://www.ccc.govt.nz/>



Positioning-centric information is changing the way people, businesses and governments work throughout the world. By applying **Trimble's** advanced positioning solutions, productivity increases and safety improvements are being realized.

Though best known for GPS technology, Trimble integrates a wide range of positioning technologies including GPS, laser, optical and inertial technologies with application software, wireless communications, and services to provide complete commercial solutions. Its integrated solutions allow customers to collect, manage and analyze complex information faster and easier, making them more productive, efficient and profitable.

Trimble products are used in over 141 countries around the world. Employees in more than 30 countries, coupled with a highly capable network of dealers and distribution partners serve and support our customers.

For over 33 years, Trimble has created unique positioning products that help customers grow their business. Our portfolio includes over 1,800 patents and serves as the basis for the broadest positioning offerings in the industry. Trimble augments its organic product development with strategic acquisitions to bring the latest positioning technologies to a wider market.
<http://www.trimble.com/>



**ARANZ Medical is an award winning technology innovator with a global presence.
We want to be part of something bigger than ourselves
and work with people to help heal people.**

ARANZ Medical specialises in 3D scanning and informatics solutions for the healthcare sector that transform clinical assessment processes, improve quality of care, and make service delivery more cost-effective. ARANZ Medical's key innovations include: Silhouette, an FDA-approved advanced wound surveillance system; and FastSCAN which enables the custom-fit of orthotics and prosthetics.

All of the Company's research, development (software, hardware and system) and assembly is carried out in Christchurch with 98% of the products exported to more than 30 countries around the world. The solutions are used in a range of settings, from the largest healthcare providers in the US, to clinical researchers in rural Africa studying the Buruli ulcer, one of the most neglected tropical diseases.

The ARANZ Medical solutions are rapidly growing in demand due to the increased prevalence of diseases like diabetes, an ageing population, more accountable healthcare and the emerging telehealth trend. Over 40 million people around the world suffer from chronic wounds such as pressure ulcers, venous ulcers and diabetic ulcers, and this number is expected to grow to over 60 million between 2012 and 2017. Wounds typically account for 2-4% of health expenditure and can lead to amputations, readmissions, social isolation, sepsis, significant pain, and death.

Dr Davey, CEO of ARANZ Medical, says, "Our mission is to use our skill in laser technology and IT to equip researchers and clinicians alike with knowledge that will empower them to improve the lives of millions of people worldwide, including high risk groups such as diabetes sufferers and the elderly."



Wynyard Group is a market leader in high consequence crime fighting and security software, used by law enforcement and national security agencies, critical infrastructure operations and major corporations.

Its advanced crime analytics, advanced security analytics and investigations case management platform helps solve growing big data and security problems including organised and transnational crime, new generation extremism and high consequence cyber crime.

Wynyard can help your organisation to:

- Discover serious threats hidden in the masses of data already being collected but not effectively analysed within an organisation's network logs.
- Prioritise previously unknown threats that you were unaware resided on your network before they become dangerous and unsolvable problems.
- Consolidate security intelligence, including both structured and unstructured data, across your security team
- Reduce operational, financial and reputational risk.

Wynyard partners with major systems integrators and the world's leading software companies and has offices in the United States, United Kingdom, Canada, Middle East, Australia and New Zealand.



Dynamic Controls is a world leading designer and manufacturer of electronic controls for power wheelchairs and scooters. Focusing on innovation and growth in the bio medical engineering sector, Dynamic Controls works to go above and beyond expectations to ensure end users receive the best product possible in order to enhance their quality of life. Dynamic Controls is unique in that we specialize in the medical mobility market. Products range from cost effective controllers to a world leading modular control system that can be customised to suit a wide range of user needs. In addition we have a range of scooter controllers suitable for small, lightweight mini shoppers to rugged outdoor scooters. All our products are renowned for reliability. Dynamic Controls is a global organization which employs over three hundred people, with corporate headquarters in New Zealand and regional offices in the United Kingdom, North America and Asia.
<http://www.dynamiccontrols.com/>



Orion Health's 350 (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, Dubai, Singapore, Bangkok, France, 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.



At Datacom, we have a diverse blend of talented people, many from all over the globe.

With 50 years' experience in technology, we have grown to be one of Asia Pacific's leading locally-owned IT-based service providers. We operate across New Zealand, Australia, Malaysia and the Philippines. We design, build and run IT systems and processes for businesses. Our success comes from giving our people the opportunity to play to their individual strengths and keep thinking fresh. At the same time, we all have something in common, and that's a real passion for delivering new, innovative and award-winning IT solutions that give our customers the leading edge. Career development to us means enabling our people to create and pursue their own career paths by giving them the tools and the opportunities to develop themselves. Whether it be by supporting staff in further education or enabling them to be involved in projects that will enhance their skills, we look to empower our staff to shape their own careers and expect them to do so. Our focus is on providing our customers with world-class IT solutions and we take pride in constantly pushing the boundaries. Our customers find us transparent and easy to deal with and this translates into how we operate internally – you won't find any unnecessary process or barriers to getting things done here.



Tait customers protect communities, power cities, move people, harness resources and save lives all over the world. We create and support their critical communications.

From our strong position as leaders in radio communication technology, we work hard to gain a deep understanding of the issues, problems, and day-to-day working environments our customers' experience. That is how we deliver robust, fit-for-purpose products, exceptional customer service, and world class communication system performance.

Our LMR products and systems are designed and built by our people. We stand by their quality, integrating, testing and perfecting everything we sell. Our specialties include P25 (Phase 1 and Phase 2), DMR (Tier 2 and Tier 3), MPT-1327, Analog Conventional, and software to manage and monitor those radio networks.

We also recognize the increasing importance of business systems like dispatch, AVL, LTE, cellular, voice recorders, SCADA, and many more to come. We integrate these diverse technologies to deliver stronger, simpler, and smarter solutions. Through these efforts, we're redefining critical communications.

Special thank you to our sponsors:

Principal Sponsor

