Industrial Information & Control Centre (I^2C^2)

Automatic control, plant-wide management of production and resources, and process simulation have a major role to play in New Zealand's future. Our ability to compete globally will be boosted by the enhanced management of processes and resources and more efficient energy utilisation, the result of turning data into industrial information for control.

A Centre in Industrial Information and Control (I^2C^2) has been established in the Faculty of Engineering at The University of Auckland, an institution which is consistently ranked in the top 1 percent of universities worldwide by the Times Higher Education Supplement.

The new Centre will provide a national focal point for research, postgraduate study, graduate training, continuing education and industry consultation in industrial information and control.

The Need

A significant percentage of New Zealand export industries, like dairy, food, pulp and paper, and metals, depend on automation, but this is only part of the answer.

We need to offer a greater range of education and industry opportunities for engineers working in New Zealand's process and manufacturing industries.

By improving both learning and on-the-floor expertise in industrial information and control, we can:

- improve levels of process control implementation
- reduce dependence on imported software and expertise for modelling and control
- open up new business opportunities
- lower energy usage
- improve eco-efficiency
- improve quality (value added)
- encourage the development of complex export products.

By focusing on these factors, New Zealand companies have the opportunity to not only improve their profitability and their sustainability, but also to enhance the development of a knowledge economy.

Focus of the Centre

The Centre will focus on three main areas:

1. Training to upskill existing and future work forces in advanced process simulation, management and process control.

2. Research and development, including the high-level technology transfer of research to New Zealand process and manufacturing industries.
3. Independent expert technical opinion in industrial information and control – specifically process modelling and simulation, process control and automation and process management.

Strength through collaboration

The majority of New Zealand's leading experts with research track records in process control are distributed between The University of Auckland and the Auckland University of Technology (AUT), which are the two lead organisations in the Centre.

With these two tertiary institutions working in partnership, the Centre will have access to more research and will have new opportunities for collaboration in seeking research funding and consulting projects.

Both The University of Auckland and AUT offer undergraduate and postgraduate courses in automatic control specialising in instrumentation and process control. The creation of a single laboratory of state-of-the-art distributed hardware, software, and the concentration of expertise would benefit students from both institutions.

The new Centre will also seed collaborations with other similar centres internationally – such as the Process Simulation and Control Group at the University of Calgary (Canada). The Centre will also utilise our significant linkages with the Institute of Measurement and Control (IMC), which has pledged strong in-kind support.

Centre Strengths

- Centre principals with significant international experience and networks
- A multi-disciplinary team across chemical, electrical and mechanical engineering
- Multi-institutional partnerships with The University of Auckland, AUT and the University of Canterbury as members of the steering group.
- Industry support including Beca, Fonterra and the Institute of Measurement and Control New Zealand
- State-of-the-art laboratories and training facilities at the Faculty of Engineering at The University of Auckland.
- A team of talented research associates and research assistants available for industry projects.

Case Studies

- Advanced Process Control at Mangere Wastewater Treatment Plant, 2006: A novel dissolved oxygen control system designed by a Centre principal saved WaterCare $400,000 per year. The project was also awarded an Association of Consulting Engineers NZ Award of Merit in 2007, best modelling paper at the NZ Waste Water Association 2008 Conference and John A Brodie Medal for best paper at the Chemical Engineering Australasia 2008 conference.
- Advanced Control Tuning for Texmate, 2008: A novel self-tuning algorithm developed by a Centre principal was implemented in firmware for a new industrial controller manufactured in New Zealand.
- Modelling and Control courses for New Zealand industry since 2003: one-to-four-day in-house courses taught by Centre principals in data analysis, modelling, control and optimisation. Clients include NIWA, Reserve Bank, Transpower, Westpower, Energy Companies, Engineering Companies and the Ministry of Fisheries.
- Gas Processing, Simulation and Control courses for NZ industry since 2006: one-to-four-day in-house and public courses taught by a Centre principal for Independent Technologies, Transfield Worley NZ, Shell NZ, and IMC.

The I²C² Team

Our team is a multidisciplinary group of engineers with backgrounds in aluminium, manufacturing, pulp and paper, bio technology and oil and gas processes.

The team has close links with The University of Auckland's Light Metals Research Centre, other universities and industries in New Zealand, and with universities and industry internationally.

Director Profiles

Brent Young
Brent Young is a full Professor and Chair of Food & Process Engineering in the Department of Chemical and Materials Engineering at The University of Auckland.

He was a lecturer at the University of Technology, Sydney, Australia for eight years and also spent seven years as Associate Professor of Chemical and Petroleum Engineering at the University of Calgary. Brent joined The University of Auckland in 2006 where his research centres on process simulation and control (food, light metals, oil and gas, refinery processing and wastewater), and process design and development (bio fuels and novel processes).

David Wilson
David Wilson is an Associate Professor in Electrical Engineering at Auckland University of Technology. Prior to joining AUT he was on the faculty at Karlstad University in Sweden.

David's background includes electrical engineering, modelling and control where his work delivered both tangible operating benefits and developed new academic control algorithms for industry. David has also worked on non commercial projects, including the optimal management of squid fishing (with the Ministry of Fisheries), and management of fresh water ecosystems around pulp mills.

Other Centre members

- Professor John Chen
- Professor Mark Taylor
- Dr Wei Yu
- Dr Reuben Brown

Contact

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The Industrial & Information Control Centre (I²C²) is a joint project between
The University of Auckland the Auckland University of Technology

THE UNIVERSITY OF AUCKLAND
FACULTY OF ENGINEERING

AUT UNIVERSITY

INDUSTRIAL INFORMATION & CONTROL CENTRE
I²C²