


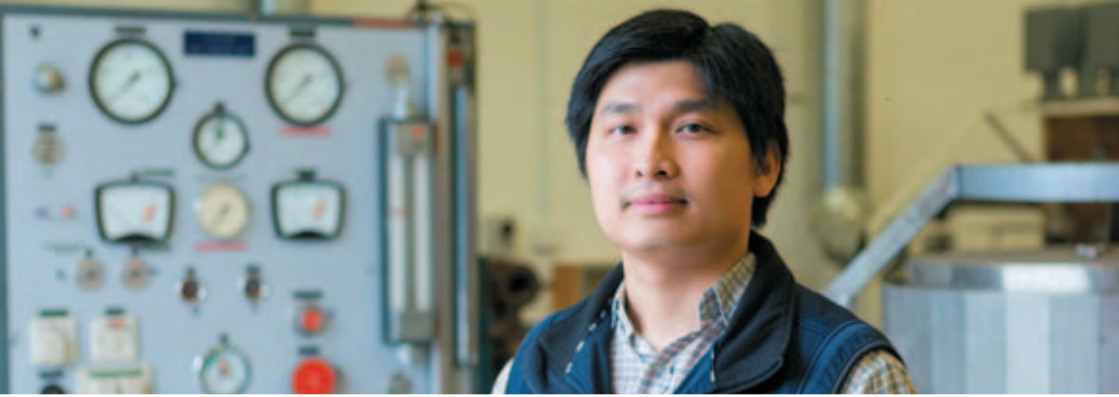


Mechatronics and Reliability Engineering



Research in the areas of mechatronics and reliability engineering at Federation University Australia has particular capability in condition monitoring, instrumentation, reliability and gap analysis, modelling and simulation.

Located at our Gippsland Campus, we have strong links with industry.



FedUni's mechatronics and reliability engineering researchers undertake a wide range of industry-relevant projects, applying more than fifty years' combined experience in data acquisition, instrumentation, programming and modelling to the most challenging problems.

As examples, we have developed systems to monitor and control oxycoal-fired burners aimed at zero carbon emission and dedicated sensing for bridges to aim life time predictions.

Partnerships & Networks

With a strong track record of engagement with industry, most staff have worked with most international and local companies at one time or another. Key companies that staff are currently engaged with include AGL, Gippsland Water, ENGIE, OMRON, Robot Technology, BOSCH, STS, Lions Co., National Instruments and Railways Network Owners.

Previous Projects

- » Pneumatically driven Master-Slave fingers movement control using hall-effect sensory system
- » Digital imaging and data processing for real-time fish size identification and sorting
- » Monitoring & modelling of steel reheating furnaces to increase efficiency
- » Condition monitoring of co-firing power station burners to improve flame stability
- » Fault diagnosis of plating plant
- » Structural health monitoring of bridges using fibre Bragg sensors

Recent Grants and Awards

Over the last ten years we have worked on projects worth more than \$6M. Currently we are working with Vic Roads, ENGIE, AGL, OMRON and Australian Paper.



Remote sensing



Training robotic systems



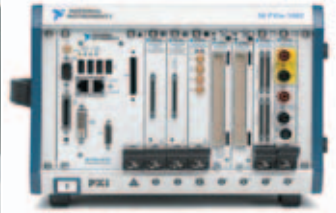
Data acquisition with NI LabVIEW



Kawasaki RS006L



OMRON Machine Automation Controllers



National Instruments PXI

Research facilities

Robotic systems for training and prototype work

- » Kawasaki RS006L – With a payload of 6kg, the robot arm has research applications in the areas of assembly, material handling, sealing / dispensing, machine tending and material removal.
- » BAXTER Research Robot – Research applications in human robot interaction, computer vision, machine learning, artificial intelligence, motion planning and applications in different mechatronics system.

Industrial grade vision systems

- » OMRON Vision Sensors and Machine Vision Systems – The industrial scale system has research application in analysing images to perform appearance inspection, character inspections, positioning and defect inspections.
- » OMRON Machine Automation Controllers – The industry compatible programmable controllers have a wide range of research applications in industrial process control and automation.

Industry standard data acquisition

- » National Instrument Data Acquisition Systems – including PXI and myDAQ
- » Software – National Instrument LabVIEW, National Instrument MultiSim, Abacas, Sysmac Studio, Inventor
- » QuantumX system and Dynamic Optical Interrogator



Automated custom sorting system



Oxy-coal burner monitoring



Undergraduate robotic teaching

Our Researchers

Professor Steve Wilcox PhD, Heriot-Watt University, UK

Steve has worked on furnace operation and control, innovative instrumental techniques for coal combustion, Intelligent Monitoring of Co-Fired Pulverised Fuel Burners, Monitoring and Control of Stoker-Fired Boiler Plant by Neural Networks and many significant externally funded projects. His research interest includes sensors for plants and processes, signal processing, artificial intelligence and condition monitoring.



Dr Tanveer Choudhury PhD, Swinburne University of Technology, Australia

Tanveer has extensive experience in engineering system modelling and control. His main areas of interest are in computational intelligence, engineering applications of machine learning, data mining and online predictive mechatronics control system design.



Dr Gayan Kahandawa PhD, University of Southern Queensland, Australia

Gayan primarily works with embedded fibre optic sensors. His research expertise includes mechatronics systems, structural health monitoring, fibre optic sensors and engineering application of artificial intelligence.



Dr Gopi Chattopadhyay, PhD, University of Queensland, Australia

Gopi has been leading asset management, maintenance and reliability engineering research projects since 1999. He has worked successfully in externally funded projects for railways, power generation, mining, water supply and local government. His areas of interest are asset management systems, reliability analysis, cost and risk modelling and continual improvement.



Dr Gour Karmakar, PhD, Monash University, Australia

Gour is currently working on an event monitoring through the Internet of Things (IoT). He has extensive experience in a number of research areas such as multimedia signal processing, wireless communications, sensor and social networks, IoT, maintenance scheduling, simulation modelling and artificial intelligence including fuzzy logic.



Mr Raymond Beebe, MEngSc (Research) Monash University, FIEAust, CPEng(ret), Australia

Ray has extensive industrial experience, expertise and interest in condition monitoring over 50 years, in particular vibration analysis of rotating machines and performance analysis of rotating and stationary plant. He has shared this by speaking around the world, in teaching and writing papers, articles and books.



Yousef Ibrahim (B.Sc. Mech. Eng.; M.Tech. Systems Eng.; PhD Robotics, FIEAust., SMIEEE)

Yousef is an adjunct Professor of Engineering with a vast wealth of expertise in mechatronics and mechatronic systems.



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