CURTIN UNIVERSITY

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

RECENT PROJECTS WITHIN THE DEPARTMENT

Dr A. Abu-Saida
Condition monitoring of power transformers
Application of static phase shifter units in HVDC systems.
Effect of sulphur on transformer solid insulation simulated under accelerated aging conditions
Impact of a load model on power transfer capability of an OLTC
Enhancing power transfer capability using adaptive on line transformer tap changer settings.
Electrical distribution network design for a shopping complex in Kuala Lumpur
Cost study for a power system utility
High frequency transformer model based on distributed parameters
Power control by using a tap changer
A novel algorithm for detecting internal transformer faults
Effect of harmonics on the performance of a relay
A new approach to recognising faults in power transformers using frequency analysis

Dr K-S Chan
QoS routing in a mobile ad-hoc network (MANET)
Providing improved packet transmission through a power line communication medium
Enhancing reliability in unicast mobile and ad-hoc networks.
TCP performance enhancement over MANET
MAC for a mobile ad-hoc network

Prof. K. Chung
Panoramic image capture system.
Development of wireless telemetry system for the Curtin Motorsport team
Development of a panoramic image processing technique from multiple images.
IQ impairment compensation in a DVB-T receiver
Synchronisation of two independently received digital TV signals over the Internet.
Embedded PC implementation of the multiwarp routing protocol
Remote surveillance camera with motion detection
Wireless distance detector
FoIP (Fax over IP) interphasing
IQ compensation in dual branch receivers.
An FPGA implementation of a frequency offset estimation scheme for a DVB-T receiver.
FPGA implementation of a channel equalisation scheme using an FPGA
Mr M. Darby
Prototype of a collaborative learning environment by implementing an intelligent adaptive profiler
An architecture for a collaborative learning environment prototype
Prototype of a collaborative learning environment by implementing an artificial intelligence mentor
Design of a collaborative learning environment through simulation using high-level architecture and run-time infrastructure.
Communications interface between intelligent agents in a high-level architecture system
3D modelling and specification for prototyping aircraft and integration within FDM
Feasibility analysis of an improved monitoring system
Three-dimensional models for simulation-based training analysis

Dr H. Eren
Zigbee based wireless instrument network
Wireless web sensors
Home power monitoring
Investigation of the operation of a passive RFFD
Computerised GPS error control
Wireless network for a PLC
Development of peer to peer communication for an instrumentation system
Remote tracking algorithm using low-cost satellite GPS
Wireless human condition monitoring using wi-fi or Zigbee
Wireless electric motor condition monitoring
Sinusoidal PWM inverter fed induction motor drive for an industrial petroleum plant
Wireless electric motor condition monitoring
Labview in an automated production line
Communication security in power systems.
Monitoring machine health of domestic appliances

Dr R. Howard
Low-noise balanced microphone pre-amplifier
Spectral estimation of Power Spectral Density

Prof. S. Islam
Detection of high impedance faults in a distribution system
Design of a sub-station grounding system
Ultimate cable layout design in substation trenches.
Power transmission expansion planning
Investigation into the cause of damage to electrical equipment and appliances due to inadequate earthing.
Analysis of harmonic effects in the operation of differential relays.
Stability enhancement of distributed power systems with embedded low inertia generators
Maintenance of SF6 switchgear
Study of insulating coordination in electric power transmission systems
Optimisation of losses in a power distribution network
Artificial Neural Network load flow analysis
Effect of harmonics on the optical characteristics of a differential relay.
Distributed generation protection
Network congestion management and pricing of transmission
Analysis, modelling and simulation of the Kalgoorlie nickel smelter power systems
Feasibility of HV distribution direct to the consumer's point of supply in urban and suburban areas.
Experimental model to determine transformer hotspot temperature
Short-term load forecasting in the Sultanate of Oman
Stability analysis of a power system
A protection system for an industrial plant.
Reliability evaluation of a distributed generation system
Study of the effects of LFT and EPR on a gas pipeline with respect to a 132 kV line
Transformer insulation and heating
Loss reduction in power distribution systems
Determining the protection adequacy of an islanded distributed generation system
Demand side management of non-essential loads
Harmonic analysis of an industrial power distribution network
Optimising automatic reactor and capacitor switching (ARCS) schedules
Continuity of generation of a distributed generation islanded power system following an emergency
An investigation into the performance of over-current and distance protection schemes on radial distribution systems containing distributed generation
Demand side management in a smart grid
Loss reduction in power distribution systems
Condition assessment of steel sleeved reinforced timber poles
Distributed protection
A probabilistic voltage profile in the presence of embedded wind generation
Analysis of emissions and fuel consumption of power generation systems under varied load

Dr D. Jayaweera
Impact of distributed generators on distance protection
Transient stability assessment of wind farms.
Generic distribution network design
Optimal placement of DAs in distribution networks
State estimation of active distribution networks
Cost-based placement of DGs
Optimal dispatch of a DG in a micro-grid
Protection coordination in a micro-grid
Security constrained interconnection of power plants in a distribution network
Dr Y.H. Leung
Location tracking using digital fractional delay
Comparison of the error margin between a 2nd and 3rd generation GPS system
Implementation of an adaptive FIR filter
Implementation of digital filters in FPGAs using distributed arithmetic theory
Design and implementation of the FFT in an FPGA
Simulation study of an OFDM system
Wireless data acquisition of EOG signals
Variable fractional delays
Application of signal processing in a communications system
Implementation of an adaptive FIR filter via an FPGA
Application of signal processing in a communications system
Implementation of an adaptive signal processing algorithm in an FPGA
Analysis of the summe method.
Implementation of an adaptive delay estimator
Implementation of an advanced signal processing algorithm in a Virtex II pro FPGA
Implementation of fractional delay filters
SoC implementation of an noise cancelling filter
Design of Digital Low pass filter with variable cut-off frequency
Finite wordlength effects on variable fractional delay filters
Speech processing with arrays.
Development of a signal processing experiment based on a DSP evaluation module
Robustness of a novel steerable microphone array
Implementation of FFTs in FPGAs; design considerations
Digital crossover networks for loudspeakers
Implementation of FFTs in FPGAs; implementation issues
Noise in industrial data networks
Design and implementation of signal processing algorithms in DSP processors

A/Prof. M. Masoum
Analysis and simulation of a sensorless scalar-controlled of induction motor drive
Analysis of field-oriented control in induction motors
Analysis and simulation of a shunt active filter utilising a suitable control technique
Harmonic modelling of transformers
Design of a harmonic generator for power quality analysis
Design and construction of a three phase harmonic generator
Analysis and simulation of static synchronous compensators (STATCOM)
Optimal design of a renewable apartment complex.
Smooth starting of a wound rotor induction motor
Design of a rotor resistance starter for an induction machine.
Direct torque control of permanent magnet synchronous motor drives
Calculation and design of power factor correction with harmonic filtering for a copper SXEW Process plant.
Design and implementation of a solar water pump using MFFT
A variable speed constant frequency generation in small aircraft
Ride through compensation of industrial drives subjected to voltage sags
Sinusoidal PWM Inverter Fed Induction Motor Drives
Power Smoothing of an induction generator for wind power
Power flow control of power systems with embedded FACTS devices.
Comparison of maximum power strategies in wind turbines
Modelling and simulation of doubly fed induction generators (DFIG) to provide power system support
Reactive power dispatch and voltage control in a practical utility scaled power system
Voltage sag compensation approaches
Analysis on transformer inrush current discrimination and the ultra-saturation phenomenon
Park Model of an induction machine including harmonics.
Impact of shading on the performance of photovoltaic cells.
Analysis on transformer inrush current discrimination and the ultra-saturation phenomenon
Harmonic model of a plug-in electric vehicle (PVE) charger for smart grid applications.
Comparison of derating approaches of distribution transformers serving nonlinear loads

Mr C.A. Maynard
CUB Brailler
A base Forth Language and open firmware to be used on the 68HC12 and ARM
SCADA based simulator for winery production using CITECT software
Wireless-based power sensor network
Open source "Mindtrail"
Optimisation of winery processing schedules using an evolutionary algorithm
Team maker software
Design of an IP camera
Self-configuring sensor network
An in-dash multimedia and diagnostics car computer
Scheduling process for wineries.
Expandable sensor array for data acquisition and control of a diesel engine

Dr I. Murray
CCTV system for the vision impaired
Integration of OpenAL audio for a haptics environment
Multi-channel amplifier for a blind telephonist
Braille translation - grade 2 forward and back translation
Test environment for haptic shape recognition.
CISCO router simulation
An application to allow multimodel access to the GSA (Graduate Skills Assessment)
Braille translation in mac OSX
Text to speech and LCD interface to Braille typewriter

Dr D.G. Myers
A software monitor for digital television transmissions.
3D re-construction from uncalibrated images
An SMS software module for an MHP-compliant digital TV receiver
UML to SystemC conversion
Fingerprint analysis
Electronic vermin control system

Prof. S. Nordholm
On the use of adaptive gain equalisers for speech enhancement applications
Investigation of a multi-decision, sub-band, voice activity detector
Robust control of an adaptive algorithm for acoustic echo cancelling
Blind source separation of speech mixtures
FPGA evaluation and implementation of a speech enhancement algorithm

Dr C. Ortega
Design of fast reconfigurable FPGAs
Radio communication using a commercial microcontroller and radio chip
SCADA system for a wireless sensor network
Artificial Intelligence Microcontroller
Fast data acquisition system using Xbow wireless sensors
Design of a wireless relay
Embedded systems in everyday applications
Wireless light dimmer
Data monitoring and supervisory control in wireless sensor networks
Analogue interface module for an FPGA
Sound interface via an FPGA.
VGA monitor and keyboard controller using FPGAs
Analogue signal laboratory using FPGAs and a PC
Efficient implementation of digital audio processing algorithms using FPGAs
Implementation of a DTMF receiver using sliding Goertzel filters
Embedded system using FPGAs
Design infrastructure of a simple autonomous robot using a microcontroller
Barcode reader using a microcontroller
FPGA control scheme for a single phase current control inverter.
Interfacing an LCD with a microcontroller for text and animation display
Wireless robot
Generation of DFTM tones using an FPGA
Control of small motors using an embedded system
Simple computer assembler and assembler
Extrinsic evolvable hardware
Wireless robot
Development of a simulation platform to aid in the evaluation of algorithms for multi-robot swarm systems.
FPGA clusters for image processing
LED Billboard
Development of a modular autonomous robotic platform for educational use.
Dynamic measurement of car fuel efficiency with recording/plotting function
Wireless sensor networks
Environment detecting art
A household utility monitoring system
Wireless General Purpose Display
Communication protocol for ad-hoc wireless sensor networks
Speed measurement using infrared sensors
User-friendly smart-home infrastructure
Signal processing using CPLDs
An embedded system for barcode reading applications
Graphical interface for LED animation
Remote control of a robotic platform using an iPhone
An electronic retina
Cellular automata demonstration system

Dr S. Rajakaruna
Design and implementation of a single phase FPGA control current inverter
Dynamic voltage restorer compensator; the analysis with a renewable source for an industrial park.
Household current harmonics compensation using a shunt active filter
Control of the output power of a proton-exchange membrane fuel cell
Design of a voltage-boosting inverter for fuel cell applications
Design of a single axis tracking system for a PV array
Maximum power point tracking of a field connected PV array using a Z-source inverter.
Control of a Z-source inverter in a solar water pumping application
Sizing of the battery bank of a stand-alone self-excited induction generator driven by a wind turbine.
Design of a solar power system for a building
Control of wind turbine driven induction generators using Z-source inverters
Design of a capacitor switched self-excited induction generator for wind powered applications.
Modelling and analysis of the energy supply system of a fuel-cell plug-in electric vehicle
Control of a Z-source DC-DC converter with an ultra-capacitor bank in a vehicle application
Design of a single phase Z-source inverter
Improving energy efficiency of a RAC Roadside Assistance Vehicle
Design of a fuel cell-based submarine power system
Design and the control of the energy supply system of an electric vehicle supplied by fuel cell and ultra-capacitors
Control and design of DC grids for offshore wind farms
Improvement of grid power quality using fuel cell distributed generators
Design of a Z-source inverter controlled fuel cell - wind hybrid power supply
Design of a superconducting magnetic energy storage system for a wind farm
Design of a single axis tracking system for a PV array
Control of a 3 phase induction motor supplied by a PEM fuel cell stack in an electric vehicle
Design of a reactive power controller for a self-excited induction generator driven by a wind turbine
Demand side management applied to commercial and industrial practices
Improvement of energy efficiency of the Curtin IT facility
Design of a protective device for welding machines to minimise electrocution.
Design of a solar photo-voltaic system for Curtin IT services
Design and simulation of an integrated PV micro-hydro system
Prediction of the performance of a variable-speed self-excited induction generator
Controlling of a two-source inverter in a grid connection of renewable energy sources

**Prof. P. Wolfs**
- PV in Smart grid for electricity distribution in Western Australia
- Assessment of back-up feeder protection on the South-west interconnected system
- Smart meter home area energy network demonstration/testbed facility.
- Impact of charging electric vehicles and plug-in hybrid electric vehicles on power grid frequency and voltage fluctuations

**Dr W-Y. Yan**
- Remote control of a power supply
- Stability analysis of a decentralised networked control system
- Display and control of a graffiti robot.
- Remote control of a power supply