



UNSW
THE UNIVERSITY OF NEW SOUTH WALES

ENGINEERING

TASTE OF RESEARCH

SUMMER SCHOLARSHIPS 2009/2010



Have you ever wondered what research is about?

Or whether you would be interested in a research career?

To give you an opportunity to find out, the Faculty of Engineering offers **Taste of Research Summer Scholarships**.

More than 55 scholarships funded by the Faculty and its ten schools and the National Information and Communications Technology Australia (NICTA) are available.

Visit www.eng.unsw.edu.au for:

1. A complete list of projects
2. Detailed description of each project
3. Project supervisor contact details
4. Apply online

Eligibility

- You must be a high achieving third-year* undergraduate student enrolled in a full-time program (second-year students may be considered in special circumstances)
- You must be enrolled in a relevant program at UNSW or another Australian university
- You must submit an application form by 30 September 2009
- You may be a local or an international student

*students undertaking a combined undergraduate degree (eg. BE/BE, BE/BCom) may apply if entering their final year of study in 2010. This exemption does not apply to students enrolled in a BE/MBiom.

Benefits

- \$458 per week stipend (tax exempt)
- UNSW Bachelor of Engineering students may use their Taste of Research Summer Scholarship project as a contribution towards their Industrial Training requirements

Availability

- The scholarships are available in a variety of research areas for a period of 12 weeks, from 16 November 2009 to 19 February 2010

For Further Information

Faculty of Engineering,
Administrative Unit,
Bronwyn Ward,
02 9385 6171,
bronwynward@unsw.edu.au
www.eng.unsw.edu.au

CRICOS Provider Number 00098G

Graduate School of Biomedical Engineering

School Contact: Gregg Suaning
T 02 9385 3892 **E** g.suaning@unsw.edu.au
www.gsbe.unsw.edu.au

Biomaterials and Tissue Engineering

Engineering biosynthetic cell-based systems for treatment of diabetes

Penny Martens, Laura Poole-Warren

Fabrication and Characterisation of Silk/PVA copolymer gels

Penny Martens, Laura Poole-Warren

Growth factor delivery using PVA hydrogels

John Whitelock, Penny Martens

Lab-on-a-chip system for analysis of stem cell division trees

Robert Nordon, Gary Rosengarten

The chitosan bandage - a potent mediator of wound healing

Megan Lord, John Whitelock

Wound Healing Modulation using Nano-Silver

M. Lord, W. Teoh, C. Gunawan, R. Amal

Physiological Measurement, Modelling and Neurostimulation

FES Cycling - stimulus programming system

Gregg Suaning, Nigel Lovell

Wireless gyroscope position indicator for human joints

Nigel Lovell, Gregg Suaning

Chemical Sciences and Engineering

School Contact: Jie Bao
T 02 9385 6755 **E** j.bao@unsw.edu.au
www.chse.unsw.edu.au

Assessment of membrane ageing in water industry

Pierre Le-Clech

Core-shell nanoparticles for drug delivery

Martina Stenzel

Enhancing Surface Segregation of Anti-fouling Additives for Membranes

Vicki Chen, Jaleh Mansouri

Experimental studies on autonomous control systems for plantwide processes

Jie Bao

Exploring the Use of Magnetic Nano-Gold for Efficient Gene Delivery into Mammalian Cells

Rose Amal, May Lim

Flexible and Transparent Graphene Film as Electrode for Semiconductor Solar Cells

Rose Amal, Yun Hau Ng

Molecular evaluation of traditional and novel anti-scalants for desalination

Greg Leslie, Anthony Granville

Nitroxide-mediated polymerization in miniemulsion based on in situ surfactant formation

Per B. Zetterlund

Novel sensors based on polymer coated magnetic materials

Anthony Granville

Online operation monitoring for IsaMills

Jie Bao, Runyu Yang

Osmotic dehydration of plant-based materials

Weibiao Zhou

Photocatalysts for an integrated photocatalytic/filtration reactor array

Rose Amal, Jason Scott

Responsive Gold Nanoparticles For Use In Nanomedicine

Tom Davis, Michael Whittaker

Separation of CO₂ from pre-combustion syngas using hollow fiber membranes

Vicki Chen, Hongyu Li

Toxicity Assessment of Nanoparticles in Human Cell Lines In Vitro

Rose Amal, May Lim

Tungsten trioxide particles with fine-tuned morphologies for pollution abatement

Rose Amal, Jason Scott

Use of Zinc (II) Species to Control Bacterial Nitrification in Chloraminated Water Supplies

Rose Amal, Sanly Liu

Visualization studies of submerged hollow fibre filtration with periodical backwash

Vicki Chen, Yun Ye

Civil & Environmental Engineering

School Contact: Wei Gao
T 02 9385 4123 **E** w.gao@unsw.edu.au
www.civeng.unsw.edu.au

Bactericidal Properties of Nanoparticulate Silver

David Waite, Adele Jones

Beach Erosion and Accretion – Investigation of ocean waves at the earth-ocean boundary.

Chris Blenkinsopp, Ian Turner

Climate Change Adaptation - Beach Erosion Response to Sea Level Rise and Wave Climate

Ron Cox, James Carley

Computer simulation of cracked structures

Chongmin Song

Designing an effective aquitard barrier

Wendy Timms, Ian Ackworth

Do GCMs simulate long term persistence in Rainfall?

Ashish Sharma

Environmentally relevant algal cultures: the case of Microcystis

Michael Short, Rita Henderson

Evaluating the hydrological cycle from space

Matthew McCabe, Jason Evans

Factors Controlling Growth and Toxicity of Harmful Algal Blooms in Drinking Water Supplies

David Waite, Brett Neilan

Financial Planning for Road Pavement Management

Chen Cai

Forecasting Rain - Just how accurate can our forecasts be?

Ashish Sharma, Raj Mehrotra

Iron and Copper Transformations in Natural Aquatic Systems

Ninh Pham, David Waite

Measuring Australia's Water Use from Space

Matthew McCabe

Nutrient impacts in environmental assessment of products

Greg Peters

Static and dynamic response analysis of structures with uncertainty

Wei Gao

Uranium Transport in Subsurface Environments

Richard Collins, David Waite

Will Flood Risk Increase with Global Warming?

Ashish Sharma, Seth Westra

Computer Science & Engineering

*Note: this is not a complete list of available projects. For further information please refer to the website www.eng.unsw.edu.au/current/scholar/tasteof.htm

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T 02 9385 6925 **E** morri@cse.unsw.edu.au
www.cse.unsw.edu.au

Algorithms

Constraint Programming based Column Generation for Vehicle Routing

Michael Maher, Lanbo Zheng

Open Global Constraints

Michael Maher

Artificial Intelligence

An automated system to enumerate valid data mining processes

Ghazi Al-Naymat, Boualem Benatallah

Computational Intelligence and Games

Alan Blair, Malcolm Ryan

Artificial Intelligence in Urban Traffic Management

Chen Cai

Fast Reinforcement Learning from Experience

Bernhard Hengst, Claude Sammut

Playing Simulated Robotic Soccer

Bernhard Hengst, Claude Sammut

Natural Language Conversation with Agents in an Interactive Virtual World

Claude Sammut, Maurice Pagnucco

Applying lessons from Netflix challenge to image search

Arcot Sowmya

Multi-level Incremental Knowledge Acquisition for Computer Aided Diagnosis of Lung CT Images

Arcot Sowmya, Paul Compton

Using Machine Learning to Model Connections between Political Competition and International Conflict

Arcot Sowmya, Ben Goldfield

Vision-based hazard detection for the visually impaired

Arcot Sowmya

An Empirical Evaluation of AI Model Building Systems

Will Uther

Computational methods to manipulate elections

Toby Walsh, Michael Maher

Using GPUs to solve challenging optimization problems

Toby Walsh, Michael Maher

Autonomous Systems & Sensing Technologies

Localisation of Nao Robots on the Soccer Field

Bernhard Hengst, Claude Sammut

Vision for RoboCup Nao Robots

Bernhard Hengst, Claude Sammut

Controlling virtual characters using artificial intelligence

Maurice Pagnucco

Perceptual Anchoring in Mobile Robotics

Maurice Pagnucco, Claude Sammut

Autonomous Robot for Search and Rescue

Claude Sammut, Bernhard Hengst

RoboCup Humanoid Robot Soccer

Claude Sammut

A multi-touch SmartBoard project

Arcot Sowmya

Bioinformatics

iHMMune-align: machine learning models and antibody genes

Bruno Gaeta, Andrew Collins, Mike Bain

Inferring regulatory networks from expression data

Bruno Gaeta, Mike Bain

Databases

Mining pairs trading patterns from a large stock market data

Ghazi Al-Naymat, Sherif Sakr

An Implementation of SPARQL Query Processor

Sherif Sakr

ORM vs JDBC: Do we still need SQL?

John Shepherd, Helen Paik

Embedded, Real Time & Operating Systems

Event-Based Device Drivers

Peter Chubb, Leonid Ryzhyk

Linux as a Boot Loader

Peter Chubb

Networks for Reconfigurable Systems on a Chip

Oliver Diessel

Covert Channels - building infrastructure to steal secrets

Kevin Elphinstone

Lottery Scheduling for Embedded Systems

Kevin Elphinstone

Locking tradeoffs for multiprocessor kernels

Gernot Heiser, Kevin Elphinstone

Performance limits of IPC fastpath implemented in C

Kevin Elphinstone

Linux as a Component

Ihor Kuz

Video phone

Ihor Kuz, Nicholas FitzRoy-Dale

Multi-VDD Power Analysis

Sri Parmeswaran, Jorgen Peddersen

Power Analysis of Leon3 Processor

Sri Parmeswaran, Jorgen Peddersen

Formal Methods

A Pragmatic, Formal Verification Framework for ARM

Assembly Code in Isabelle/HOL

Gerwin Klein, June Andronick

The Top 100 Theorems

Gerwin Klein, Thomas Sewell

Hardware Design, Computer Architectures, etc

A Memory Arbiter with Plug-and-Play Interface Protocols

Sri Parmeswaran, Anghi Janapsatya

C/C++ Memory Controller Model

Sri Parmeswaran, Anghi Janapsatya

Efficient DDR-RAM Simulator

Sri Parmeswaran, Anghi Janapsatya

Human Computer Interaction

Cognitive Load Analysis in Pen Interaction

Fang Chen, Julien Epps

Harder than the eye can see – Eye-gaze patterns under High Cognitive Load

Natalie Ruiz, Fang Chen

Loaded gestures: Automating analysis of Manual Gesture for Cognitive Load Detection

Natalie Ruiz, Fang Chen

Phonemote – Turning Mobile Phones into Wii-like Game Remote Controllers

Arcot Sowmya

Smart Room Interaction Environment

Arcot Sowmya

Image Processing

Pedestrian Detection Using a Cascade of Boosted Classifiers

Jian Zhang

Object detection using stereo camera

Yang Wang, Getian Ye

An improved face detector

Getian Ye, Yang Wang, Bang Zhang

Learn to detect vehicles using low-level features

Getian Ye, Yang Wang

Miscellaneous

Software for Advanced Patent Analysis

Vladimir Tosic, Mark Staples

Multimedia & Visual Communication

A Real-time and Robust Object Tracking System for the Video Surveillance

Jian Zhang, Sijun Lu

Objects Classification and Event Detection in Surveillance Video

Jian Zhang, Sijun Lu

Networks, Sensor Networks, etc

Analyzing data from EnergyAustralia's WiMAX deployment

Athanassios Boulis

Testing communication protocols in a real sensor network deployment

Athanassios Boulis

A Novel Privacy Preserving Technique for e-Commerce

Salil Kanhere

Programming Languages and Software Engineering

A Parallel Physics Engine

Manuel Chakravarty, Roman Leshchinskiy

Demand-Driven Dynamic Symbolic Execution for Detecting Bugs and Security Vulnerabilities

Jingling Xue, John Potter

Dynamic Datarace Analysis for Concurrent Java Programs

Jingling Xue, John Potter

The Semantics and Implementation of Cartesian Programs

John Plai, Blanca Mancilla

Software Engineering

C/C++ Code Visualisation

Ralf Huuck, Ansgar Fehnker

Software Engineering on Cloud Application Platforms

Anna Liu, Jenny Liu

Adaptive exception healing in Cloud-based Web services

Jenny Liu, Anna Liu

Integrating mashp technologies with Web-based social network applications

Jenny Liu, Liming Zhu

Business-Driven Selection of Web Services

Vladimir Tosic, Jacky Wai Keung

Web-based Process Mashup

Liming Zhu

Web-based Process Mashup

Liming Zhu

Theoretical Computer Science

Exploring SMT solvers for Software Analysis

Ralf Huuck, Ansgar Fehnker

Soft Open Constraints in a Semi-Ring Framework

Michael Maher

Web Services, E-Commerce, and other Web Technologies

Business Process Mining

Ghazi Al-Naymat, Boualem Benatallah

Using IT Exploration for Process-Centric Entity Discovery & Auditing

Adnene Guabtni, Boualem Benatallah

Distributed Decision Making Engine for Mobile Devices (iPhone)

Jacky Keung, Liming Zhu

Indigenous Community Search Engine

Cat Kutay, Helen Paik

New Methods for Visualising Two-mode Networks

Michael Maher, Lanbo Zheng

Context-sensitive Service Configuration and Delivery

Helen Paik

Towards Document and Template-based Mashups

Helen Paik

Towards Personal, Configurable Email Services

Helen Paik, John Shepherd

An Empirical Evaluation of RDF Stores

Sherif Sakr, Boualem Benatallah

UNSW Course Advisor

John Shepherd

Business-Driven Management of Web Services

Vladimir Tosic, Jacky Wai Keung

Distributed mining for complex patterns in large astronomical data

Srikumar Venugopal, Ghazi AHNaymat

Management Framework for a Virtual Infrastructure

Srikumar Venugopal

Service Oriented Architecture for e-Business Standards

Liming Zhu, Ross Jeffery

Electrical Engineering & Telecommunications

School Contact: Julien Epps

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Data and Mobile Networks

Characterization and Exploration of Online Social Networks such as Twitter

Sebastien Ardon, Anirban Mahanti

Content Distribution for the National Broadband Network

Tim Moors

Developing Novel WiMAX Applications in Test Beds

Jinhong Yuan, Wei Zhang

Experiments on the NICTA NetFPGA platform

Vijay Sivaraman, Arun Vishwanath

How can middleboxes (e.g. firewalls) tell end-users what policies block their network access?

Tim Moors

Removing private information from packets captured on networks

Tim Moors

Energy Systems

Ultra high frequency detection of partial discharges

Toan Phung

Microelectronics and Quantum Computing

Design and Modelling of Silicon Spin Qubits for Quantum Computing

Andrew Dzurak, Andrea Morello

Microelectronic Circuit Design for Biomedical Implants

Torsten Lehmann

Microelectronic Circuit Design for Quantum Computing

Torsten Lehmann

RF MEMS

Rodica Ramer

Photonics

Diamond-base photonics for quantum communication

Francois Ladouceur

Electro-active gels for display application

Francois Ladouceur

Modelling of phase transition in electro-active hydrogels

Francois Ladouceur

Signal Processing

Analysis of similar voices for speaker recognition

H. Nosratighods, E. Ambikairajah

Cognitive Load Analysis in Pen Interaction

Fang Chen, Julien Epps

Cognitive Load Measurement via Speech

Eric Choi, Julien Epps

Real Time Anger Recognition from Speech

H. Nosratighods, E. Ambikairajah

Reliability, safety, and control of autonomous ground vehicles

Ray Eaton, Jayantha Katupitiya

Signal processing in bioinformatics: Periodicity analysis of DNA sequence data

Julien Epps

Systems & Control and Biomedical Systems

Ultrasound-based patient tracking for the unobtrusive estimation of falls risk

Stephen Redmond, Nigel Lovell

School of Mechanical and Manufacturing Engineering

School Contact: Jayantha Katupitiya

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Air and Ground Vehicles

Application of Monte Carlo estimation techniques for estimation/inference problems in engineering

Jose Guivant

Intelligent Coordination of Multiple Autonomous Vehicles

Ngai Ming Kwok

Interfacing of the Control Computer for the Wall Climbing Robot

J. Katupitiya, Ray Eaton

Joystick based control of the VTAV aircraft

J. Katupitiya, Jose Guivant

Non-Deterministic Flight Simulation

John Page, Zoran Vulovic

Research of techniques for video feature extraction for applications in autonomous systems

Jose Guivant

Design and Analysis

Development of a frictional rig on the Instron 3300 Testing machine

Philip Mathew

Optimal control of an oscillating hydrofoil based tidal current renewable energy power converter

Jose Guivant, Gerold Kloos

Life-cycle Engineering

Energy and Eco-efficiency of Electric Discharge Machining Process

S. Kara

Thermofluids

Development of Fire Suppression Experimental System

Tracie Barber

Experimental Study of Haemodialysis – Vascular Access Model

Tracie Barber

Flow visualization in a stenosed artery

Tracie Barber

Study of heat transfer enhancement in micro channels for design of novel micro heat exchangers

Victoria Timchenko

Study of the fluid mechanics of micro/nano particle-pore interactions

Gary Rosengarten

School of Photovoltaic & Renewable Energy Engineering

School Contact: Shujuan Huang

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Antenna Collection of Solar Energy

Richard Corkish, Gavin Conibeer

Development of Commercial Solar Cell Technologies

Stuart Wenham, Nicole Kuepper

Fabrication and characterisation of silicon quantum dot structures

Santosh Shrestha, Gavin Conibeer

Investigate different metals to improve the contact on materials for 3rd Gen PV devices

Ivan Perez-Wurfl, Gavin Conibeer

Setting up a module for measuring light induced current in 3rd Gen light detectors

Ivan Perez-Wurfl, Gavin Conibeer

School of Surveying & Spatial Information Systems

School Contact: Andrew Dempster

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“Cell ID” WiFi Algorithms for Location

Andrew Dempster, Binghao Li

A Simulator of Global Navigation Satellite Systems

Samsung Lim, Binghao Li

Development of an Unmanned Aerial Vehicle Platform

Yong Li, Shahzad Ahmad Malik

Next Generation of GNSS Reference Interface Protocol

Binghao Li, Samsung Lim

Open-Source Assisted GPS Client

Andrew Dempster, Binghao Li

Students who are awarded a NICTA Taste of Research Summer Scholarship 2009/2010 are expected to participate in NICTA's Summer Scholars Showcase. The Showcase is an integral part of the research training experience that NICTA is providing to its Summer Scholars. Further information can be found at NICTA / Summer Scholars Program, www.nicta.com.au/education/outreach/summer_scholars_program



UNSW
THE UNIVERSITY OF NEW SOUTH WALES



GROUP OF EIGHT
MEMBER

Celebrating **60** YEARS
of extraordinary achievement