2018

GRADUATION CEREMONIES

THE UNIVERSITY OF ADELAIDE

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of ADELAIDE

CHANCELLOR'S *Welcome*

On behalf of the University of Adelaide may I offer sincere congratulations to you, our new graduates.

You have joined a distinguished community of University of Adelaide alumni that spans the globe.

As a graduate of the University of Adelaide you hold a degree that is recognised and valued around the world. Our graduates have gone on to be pioneers and leaders in many fields – from science, medicine and engineering, to law, the social sciences and the performing arts. They have won Nobel Prizes, distinguished themselves in politics and the arts, and helped to improve the lives and wellbeing of countless communities.

The University of Adelaide is committed to providing an inspiring university experience and producing talented and skilled graduates. I hope that your skills and the friendships that you have made will endure throughout your life.

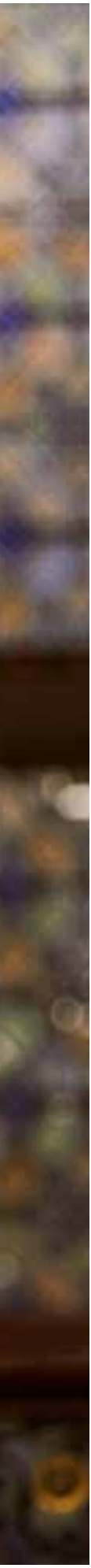
You should be proud today of your achievement in completing your studies, which is the first step on what I trust will be a satisfying and exciting career.

I would also take this opportunity, on behalf of the University, to thank those who have supported you and, in many cases, have made it possible for you to be here today.

You will always remember the University of Adelaide, and I hope you will consider it a significant part of your life, not just the past few years while studying, and not just today but forever. I encourage you to join our network of alumni and enjoy the benefits of a long association with your University.

My congratulations to you all.

Rear Admiral the Honourable Kevin Scarce
AC CSC RAN (Rtd)
Chancellor



Message from the VICE-CHANCELLOR AND PRESIDENT

Congratulations on graduating from one of Australia's leading universities.

This ceremony marks the culmination of years of study that now place you into lifelong membership of the University of Adelaide alumni – a group spread across all corners of the globe.

And you follow in the footsteps of extraordinary individuals, including some who have redefined the world as we know it, and many others who are changing their communities for the better each day. Your University of Adelaide degree will open doors to new, transformational opportunities.

Today is about celebrating your achievements with family, friends, members of staff and fellow graduates. I strongly encourage you to maintain those professional connections you have made here: many of them will stay with you for life.

Use your knowledge wisely, be bold and generous in the way you share ideas with others, and always be open to learning.

Well done: you go forward today with the warmest wishes of the University of Adelaide community.

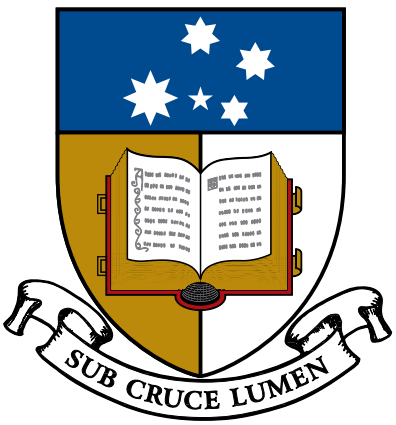
Professor Peter Rathjen
BSc (Hons) (Adel), DPhil (Oxon), Hon DLitt (Tas)
Vice-Chancellor and President

The University of Adelaide GRADUATION TRADITIONS

COAT OF ARMS

The University of Adelaide's coat of arms was granted to the University by the College of Arms, London, in 1925. It is the official symbol of the University and the stamp which ratifies every degree parchment bestowed by the University.

The crest or shield displays an open book and five stars; one of eight, two of seven, one of six and one of five points – representing the Southern Cross. A scroll containing the University's Latin motto sits directly below the shield; Sub Cruce Lumen, meaning 'The light (of learning) under the (Southern) Cross'.



BONYTHON HALL

Bonython Hall is the University of Adelaide's "great hall". It was built in the years of 1933-1936 using a generous donation of over £50,000 from renowned public benefactor Sir John Langdon Bonython.

Planned construction of Bonython Hall was surrounded in controversy. Colonel William Light, Surveyor-General for the City of Adelaide, had an original vision to extend Pulteney Street north towards North Adelaide. The Adelaide City Council was keen to see his plans carried out.

Following much debate, it was City Alderman and lawyer George McEwin who was able to convince the City Council of the University's master plan and evolving architectural beauty. Further, he pointed out that the City Council had no legal prerogative to construct roads on the private property of the University.

Consequently construction of the great hall began. This proved a critical juncture in the University's history - resulting in the University of Adelaide expanding to become one of the most picturesque campuses in the country today.

Today, Bonython Hall is home to all onshore graduation ceremonies and a number of official University events, including the annual Carols on Campus event in December.

ABOUT THE ORGAN

The organ in Bonython Hall was installed in 2002. Made in England to a tonal design by the leading Dutch firm Johannus Orgelbouw, it uses custom-built speakers to reproduce digital recordings of individual organ pipes with the acoustic qualities of a piped instrument. The four manual instrument is the largest of its type in Australia.

UNIVERSITY MACE

Thousands of years ago the Mace, a heavy club weighted at one end, was used as a blunt weapon in battle. In the sixteenth century the Mace came to be used more ceremonially – representing a symbol of protection of the King. Today, the Mace is celebrated as a symbol and warrant of office, particularly of royal or ecclesiastical office, and of institutions deriving authority from the Crown or Church.

The University of Adelaide Mace was designed by Mr I. Milward Grey of the School of Fine Arts, North Adelaide, and was made under his personal supervision by an Adelaide firm of silversmiths.

The Mace is 24 inches in length and is made of silver gilt throughout. Seventy-three ounces, just over 2kg, of metal was used in its manufacture. The Mace head forms an orb, representing the world, and features a book, a symbol of learning, and a design of gum leaves on matted ground. On either side of the orb, the University's Coat of Arms is featured along with the motto: *Sub Cruce Lumen*.

The University Mace was first carried by President of the Students Council, K H Boykett, at a Jubilee procession at St Peter's Cathedral in 1926, marking the 50th anniversary since classes first commenced.

The traditional role of the Mace Bearer in the University of Adelaide graduation ceremony is to protect the Chancellor, meaning the bearer of the Mace always precedes the Chancellor in the academic procession.

ACADEMIC DRESS

Academic dress, including the full-length robe, hood and classical headwear, dates back to the medieval 12th and 13th centuries in Europe when universities, as we know them today, were developing.

The regalia were originally worn daily by university scholars for reasons of warmth and to reflect their status in society. The sense of purpose and propriety evoked by formal academic dress has ensured the traditional has preserved over the centuries.

In contemporary times, academic dress is largely reserved for graduation ceremonies and formal university events.

Gown

University of Adelaide graduates wear black gowns in the Cambridge style, with the exception of:

- Professional Doctorate and PhD candidates whose gowns are black and faced with scarlet
- Higher Doctorate and Doctor of the University candidates who wear scarlet gowns faced respectively with the colour of their discipline or ultramarine blue.

Hood

Professional Certificate and Sub-bachelor graduates do not wear a hood.

Other graduates wear a black hood that displays a colour representative of their discipline area, except that:

- Postgraduate coursework candidates wear a black hood lined in white
- Research masters wear a black hood lined in scarlet
- PhD, Higher Doctorate and Doctor of the University candidates wear a scarlet hood lined in scarlet.

Headwear

Graduates receiving a Professional Certificate, Sub-bachelor Certificate or Diploma, Bachelor, Honours, Graduate Certificate or Diploma or Masters qualification wear a black trencher cap or mortarboard.

Graduates receiving a Professional Doctorate, PhD, Higher Doctorate, Doctor of Medicine or a Doctor of the University wear a bonnet of black velvet.

Creative Arts and Architecture
Cendre Green

Business
Helvetia Blue

Engineering and related technologies
True Purple

Health Sciences
Eosin Pink

Natural and Physical Sciences
Primuline Yellow

Society, Culture and Education
Pale Violet Grey

Information for GUESTS

The following information is provided to ensure the comfort, safety and enjoyment of everyone attending the ceremony. Please take a moment to read before the ceremony commences.

GENERAL

Toilets are located at the entrance to the hall, downstairs from the foyer.

A water cooler for your use can also be found in the foyer.

Please supervise babies and young children at all times. If they are disturbing other guests, please take the opportunity to relocate to the foyer.

Please switch off or silence mobile phones for the duration of the ceremony.

APPLAUSE

Guests are invited to applaud each graduate as they are presented on stage.

PHOTOGRAPHY

Guests are welcome to take photographs during the ceremony. However, you are requested not to disrupt the ceremony by leaving your seat or using flash photography.

Professional photographers will take a photograph of each graduate as they are presented on stage. These photographs will be available immediately after the ceremony from GFP Graduations, who will be temporarily located on the Goodman Lawns.

Alternatively graduates can order their stage photos online after the ceremony.

SAFETY AND EMERGENCY

For safety reasons guests may not enter the galleries upstairs or sit on the steps in the balcony area.

Emergency exits are marked on the plan below. Please note your nearest exit.

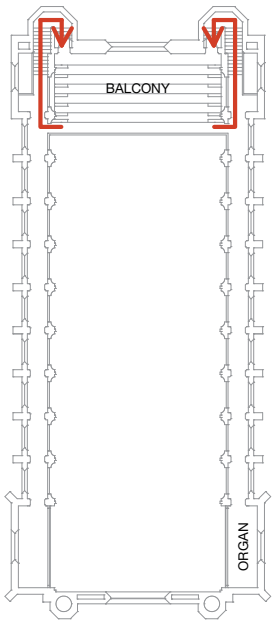
The emergency assembly point is on Goodman Lawns, west of the hall.

If it becomes necessary to evacuate Bonython Hall, an announcement will be made. Follow the directions of the Ushers, exit the hall and move to the assembly point. Guests in wheelchairs should exit the hall via the eastern entrance.

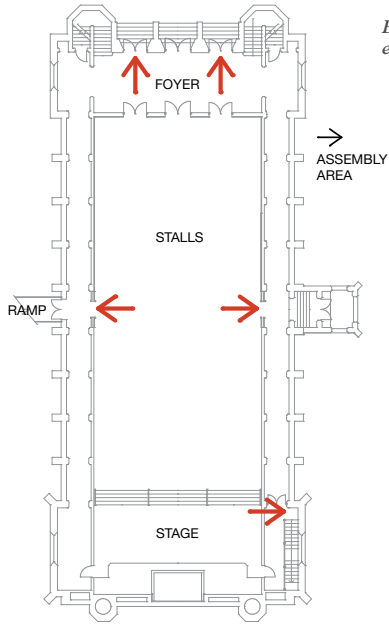
ADDITIONAL INFORMATION

Student Ushers in white shirts can provide further information and assistance.

The ceremony will last around 70 minutes.



South gallery level



Ground floor

Bonython Hall emergency exits

Order of PROCEEDINGS

Before the ceremony, music will be played on the Bonython Hall Organ by Joshua van Konkelenberg BMus(Hons), PhD (Adel), MMus (RCM), GDScreenComp (AFTRS)

Trio Sonata in G major, BWV 530, JS Bach (1685-1750)

THE ACADEMIC PROCESSION *(please stand)* will enter Bonython Hall.

Bonython 18 by Howard Parkinson, performed by the Elder Conservatorium Brass Ensemble.

- Marshals
- Doctorates in all Faculties/Schools
- Heads of Affiliated Colleges
- Academic and Graduate Staff
- Executive Deans and Heads of Schools
- Senior University Officials
- The Valedictorian
- The Orator
- The Provost and Deputy Vice-Chancellor (Research)
- The Mace Bearer
- The Chancellor

THE NATIONAL ANTHEM to be sung by Charlotte Kelso DipA, BA/BMus(Clas).

Australians all let us rejoice, For we are young and free;
We've golden soil and wealth for toil, Our home is girt by sea;
Our land abounds in nature's gifts Of beauty rich and rare;
In history's page, let every stage Advance Australia Fair.
In joyful strains then let us sing, Advance Australia Fair.

Guests to be seated

WELCOME BY THE CHANCELLOR
Rear Admiral the Honourable Kevin Scarce AC CSC RAN (Rtd)

THE OCCASIONAL ADDRESS to be given by Ms Caroline Mealor

THE MACE BEARER THANKS THE ORATOR
Dr Nam Nghiep Tran will thank the orator

CERTIFICATION STATEMENT by the Provost and Deputy Vice-Chancellor (Research) Professor Mike Brooks FTSE FACS

PRESENTATION OF AWARDS by Faculty/School

VALEDICTORY ADDRESS given by Mr Samuel Barrera

CLOSING REMARKS given by the Chancellor

THE ACADEMIC RECESSION *(please stand)* The academy will leave Bonython Hall in reverse order to that of entry, followed by the graduates. During the recession, the organist will play *Toccata in F, BWV 540*, JS Bach (1685-1750).

Guests are requested to remain standing while the procession is leaving Bonython Hall.

Presentation of AWARDS

Faculty of

ENGINEERING, COMPUTER AND MATHEMATICAL SCIENCES

Presented by the Executive Dean of the Faculty of Engineering, Computer and Mathematical Sciences, Professor Anton Middelberg BE (Hons), PhD, MA, FIChemE, FTSE

Degree of Bachelor of Mathematical and Computer Sciences

Thomas Benjamin Chadwick ..... Computer Science

Eric Hoa Chong ..... Computer Science

Stefan Raymond Evertz..... Computer Science

Joan Pavithra Joseph Xavier..... Statistics

Zachary Kwok..... Computer Science

Degree of Bachelor of Engineering

Mohsen Rezapour ... Civil and Structural Engineering

Honours Degree of Bachelor of Engineering

Muhamad Fadzil Amirullah Abd Rahim ..... Mechanical and Aerospace Engineering

Muhammad Amirul Asraff Affindi ..... Mechanical Engineering

Ahlam Abdullah Said Al Shuaili ..... Chemical Engineering

Abdul Ghafour Al-Dasooqi ..... Chemical Engineering

Ahlam Mohammed Awadh Al-Hadhrami ... Chemical Engineering

Farhad Almeer..... Mechanical and Aerospace Engineering

Ahmed Hesham Aly Mohamed Aly..... Mechanical and Aerospace Engineering

Nuraziidah Amirruddin..... Chemical Engineering

James Richard Anderson .... Mechatronic Engineering

Michael John Bardadyn ..... Mechanical Engineering

Aaren James Barker ..... Mechanical and Sports Engineering

Matthew Peter Boccaccio ..... Mechanical Engineering

Matthew Jay Mitchell Burrows ... Electrical and Electronic - Avionics

Daniel Anthony Calandro..... Electrical and Electronic Engineering

Alexandra Caroline Callisto..... Chemical and Pharmaceutical Engineering

Nathan Samuel Cartledge ..... Computer Systems Engineering

Adrian Cecchin ..... Civil and Structural Engineering

Thomas Benjamin Chadwick..... Electrical and Electronic Engineering

Chi Ip Chan..... Mechanical Engineering

Jade Katelyn Chantrell..... Mechanical and Aerospace Engineering

Brenton Chao ..... Civil and Structural Engineering

Guanhua Chen ..... Civil and Structural Engineering

Woong Ji Choi ..... Electrical and Electronic - Avionics

Eric Hoa Chong ..... Mechatronic Engineering

Jesse Liam Cordoma..... Civil and Structural and Civil and Environmental Engineering

Stephen Christopher Daenke ..... Civil and Environmental Engineering

Suhaillah Danesh..... Petroleum Engineering

Fraser Lewis Darcy ..... Mechanical and Sports Engineering

Christopher Di Girolamo ..... Civil and Structural Engineering

Carl Robert Dorsch .... Chemical - Minerals Processing

Simon George Johnston Duguid... Mechanical and Sports Engineering

Martin Elsegood ..... Mechanical and Sports Engineering

Stefan Raymond Evertz..... Mechatronic Engineering

Xiaochen Fan ..... Petroleum Engineering and Civil and Structural Engineering

Mohamad Faris Fauzi..... Chemical Engineering

Matthew Leslie Favell..... Civil and Architectural Engineering

Garth Leigh Fernandez ..... Electrical and Electronic Engineering

Arron James Flynn..... Mechanical Engineering

Lawson John Forster..... Civil and Architectural Engineering

Robin Christopher Georg..... Mechanical and Aerospace Engineering

Esther Vianna George..... Chemical Engineering

Goh Wei Zer ..... Civil and Structural Engineering

Gu Yang ..... Civil and Environmental Engineering

Yiwen Guo ..... Electrical and Electronic Engineering

Mathew Malik Haddad..... Mechanical and Sports Engineering

Mohammad Matin Hassanli..... Civil and Architectural Engineering

Jinghui Brady He ..... Mining Engineering

Bodie Henderson..... Mechanical and Aerospace Engineering

Hong Huang..... Mechanical Engineering

Muhammad Imran Akmal Ibrahim..... Chemical Engineering

Ainal Syazwan Itamta ..... Electrical and Electronic Engineering

Judah Robert Johnston..... Mechanical Engineering

Joan Pavithra Joseph Xavier .... Mechanical and Aerospace Engineering

Nur Diyana Izyan Khairulazhar ..... Mechanical Engineering

Akello Angella Komakech..... Civil and Structural Engineering

Wai Fung Kwan..... Chemical and Pharmaceutical Engineering

Zachary Kwok ..... Mechanical and Aerospace Engineering

Chi To Lai..... Civil and Environmental Engineering

Justin Le ..... Mechanical Engineering

Zhi Li..... Electrical and Electronic Engineering

Kang Liu ..... Civil and Structural Engineering

Mengyang Liu ..... Civil and Structural Engineering

Qihao Liu ..... Mining Engineering

Siyang Liu ..... Civil and Structural Engineering

Yuechen Lou ..... Mechanical and Sustainable Energy Engineering

Yunting Ma..... Mechanical Engineering

Innes Gordon MacPhail ..... Civil and Environmental Engineering

Isobel Rose Robertson March ..... Civil and Architectural Engineering

Mohamad Uzair Mat Fauzi ..... Chemical Engineering

Siti Nur Atiqah Mat Noor .... Mechanical Engineering

Kyle Alexander Millar..... Computer Systems Engineering

Ashkan Moghaddas ..... Civil and Structural Engineering

Nabeel Shah Mohammed..... Mechanical Engineering

Adel Mosavi..... Civil and Architectural Engineering

Timothy Daniel Mower..... Mechanical Engineering

Alifu Muataer ..... Petroleum Engineering

Zachary Netz..... Mechanical and Sports Engineering

Ian Andrew Newcombe ..... Civil and Structural Engineering

Er Win Ng ..... Electrical and Electronic Engineering

Li Hui Ng ..... Chemical Engineering

Wilson Nguyen..... Civil and Structural Engineering

Yuepeng Ning .... Electrical and Electronic Engineering

Muhammad Ridhwan Noor Hadi ..... Mechanical Engineering

Sean Michael O'Connell..... Civil and Environmental Engineering

Augustus Naz Okoye..... Electrical and Electronic Engineering

Emily Jane Price..... Chemical and Pharmaceutical Engineering

Nicholas George Psichogiopoulos ..... Mining Engineering

Qirui Zhang..... Mechanical and Aerospace Engineering

Genna Serene Rahman..... Chemical Engineering

Aniq Rizvi..... Mechanical Engineering

Stephen John Rudd..... Mechanical and Sports Engineering

Trevor Samim..... Mechanical Engineering

Brendan James Scott..... Civil and Structural Engineering

Thomas Brailey Scott ..... Chemical Engineering

Demi Adrienne Starick ..... Civil and Architectural Engineering

Alan James Stoate .... Civil and Structural Engineering

Boyuan Sun ..... Mechanical Engineering

Yiwei Sun ..... Electrical and Electronic Engineering

Zhi Chang Suo ..... Telecommunications

Michaela Jane Tamlin..... Civil and Structural Engineering

Tan Heng Wei ..... Chemical Engineering

Shi En Tang ..... Mechanical and Sustainable Energy Engineering

Melika Tavakolian ..... Mechanical and Sports Engineering

Joseph Taylor ..... Mechanical and Aerospace Engineering

Richard Tran Thai ... Civil and Structural Engineering

Tu Ha Anh Tran ..... Petroleum Engineering

Jason Bach-Thong Trann..... Telecommunications

Carlos Enrique Uzcategui Lopez..... Petroleum Engineering

Lourens Victor ..... Mining Engineering

Harrison Mark Vince ..... Mechanical and Aerospace Engineering

Chu Jun Wang..... Mechanical Engineering

Hui Wang..... Telecommunications

Adrian Robert Weinert..... Mechatronic Engineering

Ziyang Weng ..... Civil and Structural Engineering

Aragon Paul White..... Chemical Engineering

Natasha Lee Whitehorn ..... Civil and Architectural Engineering

Leo Lee Roon Wong ..... Petroleum Engineering

Luke Peter Woolcock ..... Electrical and Electronic Engineering

Liang Xu ..... Electrical and Electronic Engineering

Yisong Xu..... Mechanical Engineering

Tingyao Zhang ..... Mechanical Engineering

Chengjun Zheng..... Electrical and Electronic Engineering

Yiping Zheng..... Mechanical Engineering

Degree of Master of Science (Petroleum Geoscience)

Mohammed Said Sulaiman Al Hinai

Ahlam Mohamed Ali Al Jabri

Al Muhanna Mohammed Sarhan Al-Harthi

Atiya Mahmood Saif Al-Sabahi

Degree of Master of Petroleum Engineering

Ferly Komul

Muhamad Hendro Suryanto

Adrian Ho-Shan Sze

Degree of Master of Engineering (Civil and Environmental)

Weiwei Duan

Shalabh Jangala

Jiawen Li

Akshay Bhausaheb Mokal

Tengfei Wang

Junnan Wu

Ling Zhou

Yueyan Zhu

Degree of Master of Engineering (Mining)

Tong Li

Robertus Robi

Degree of Master of Engineering (Mechanical)

Jiongzhao Chen

Mengyang Jia

Yuwei Lu

Qiu Yao

Shenghao Xu

Degree of Master of Engineering (Mechatronic)

Aaron Mathew Thomas

Yinqi Zhang

Degree of Master of Engineering (Electronic)

Shanshan Li

Quoc Hung Dang

Sayyed Samir Ali

Baoqi Zhu

Degree of Master of Engineering (Electrical)

Xuliang Deng

Xinkai Liu

Syed Haider Abbas Naqvi

Xiaohui Pan

Yonghao Peng

Jun Xiong

Degree of Master of Engineering (Civil and Structural)

Chun Kit Chan

Xiaochuan Cui

Xuan Dong

Muhammad Ahmed Farooq

Usman Hafeez

Chiu Hei Ho

On Kit Lee

Xin Liu

David Mauricio Moya Roldan

Ji Yan

Degree of Master of Engineering (Chemical)

Andrés Danilo Chacón Parra

Liang Ding

Lei Guo

Degree of Master of Engineering (Aerospace)

Desheng Kong

Xinchen Zhang

Degree of Master of Philosophy

Pablo Nicolas Blanco

thesis: Parametric System Identification of Rocket Combustion Instability Using the Fokker-Planck Equation

abstract: Thermo-acoustic instabilities are a major problem in the development of rocket engines. They lead to high pressure oscillations in a rocket thrust chamber, and cause structural damage. This thesis' aim was to advance understanding of thermo-acoustic instabilities in liquid propellant rocket engines using advanced signal processing techniques. These techniques, originally developed for gas turbines, extract system-defining thermo-acoustic parameters from noisy pressure data. In this work, the techniques were applied to data from two small-scale rocket combustors. The techniques were demonstrated to work for multiple stable load points, and significant indications were obtained of their applicability to unstable conditions.

Adeel Iqbal

thesis: Quantitative Metal Detection by Microwave Assisted Laser Induced Breakdown Imaging and Spectroscopy

abstract: Microwave assisted laser induced breakdown spectroscopy (MW-LIBS) being sensitive, quick and remote analytical technique has immense potential for reliable quantitative metal detections for many industrial, mining and environmental applications provided the signal quality, sensitivity and limit of detection is improved to match the desired performance.In this research optimization of MW-LIBS system has been suggested by two separate approaches such as emission detection by narrow bandwidth elemental imaging for quantification and efficient injection of microwave radiation by a well-designed microwave near field applicator.

Degree of Doctor of Philosophy

Vichet Duk

thesis: Maritime Radar Target Detection Using Time Frequency Analysis

abstract: Detecting targets using radar in the maritime environment is a difficult problem. The sea-surface backscatter is complex with time- and range-varying Doppler spectra, while strong breaking waves often resemble targets. This thesis investigates two novel time-frequency detection techniques to solve this problem. The first technique is based on stationary wavelet transforms with an entropy-based indicator for selecting data which maximises information about the target. The second utilises sparse signal separation with a tuned Q-factor wavelet transform. An adaptive method is developed to practically implement the scheme. Both techniques demonstrate improved performance for simulated targets in real sea clutter data.

Ehtesham Ul Haq Karatela

thesis: Study on Borehole Stability in Fractured Rocks in Deep Drilling Conditions

abstract: This study provides a systematic approach to understand the issue of borehole stability in fractured rock mass in deep underground. It analyses rock mass and operational parameters and in-situ stress in 2D and 3D DEM models and explains their contribution to borehole stability. Effects of underground water pressure and mud pressure on borehole stability were investigated as well. Because of presence of discontinuities induced stresses tend to increase the tangential stress that exceeds the strength of fractured formation which leads the borehole walls to collapse. Furthermore, stress analyses showed that shear stress tends to drop significantly in the discontinuities.

Ramesh Udayashankar Karunagaran

thesis: Graphitic Carbon Materials for Energy and Environment

abstract: Over the years, graphitic carbon materials has become one of the most intensively investigated topics in both industry and academia for wide ranging applications due to its low cost, unique physicochemical properties, surface chemistry, mechanical stability, tunability to different shapes and chemical resistance. The main objective of this thesis was to investigate the use of graphitic carbon nanomaterials for energy conversion and water remediation applications. The synthesised materials were tested as oxygen reduction electro-catalysts for Oxygen Reduction Reaction (ORR) in a Polymer Electrolyte Membrane (PEM) fuel cell and also used as an adsorbent for adsorption of arsenic from drinking water.

Wendy Suk Ling Lee

thesis: Terahertz metasurfaces for wideband polarisation control

abstract: Conventional methods for achieving polarisation conversion use wave plates made of birefringent materials. In the terahertz region, there is however, a scarcity of naturally available materials with strong birefringence and low absorption. In addition, bulkiness and narrow bandwidth are intrinsic characteristics of conventional wave plates. As a solution, metasurfaces can be employed towards providing engineered birefringence at terahertz frequencies. These engineered surfaces can provide unprecedented control of electromagnetic waves over a broad bandwidth with high efficiency. This thesis covers four different designs of terahertz birefriengent metasurfaces comprising of dielectric and/or metallic resonators for applications requiring polarisation conversion

Toby Asher Lightheart

thesis: Constructive Spiking Neural Networks for Simulations of Neuroplasticity

abstract: Constructive algorithms can create synapses and neurons in artificial neural networks, automating the selection of the ANN size and contributing to the ANN learning capabilities. This thesis develops theory for constructive algorithm analysis and design, including principles for compatibility with simulations of biological neural networks. Processes for synapse construction are developed for spiking neural networks from spike-timing-dependent plasticity (STDP) models. Neuron construction is controlled by spikes from simulated neurons and a proxy for surrounding neurons. The developed constructive algorithms demonstrate compatibility with simulations of neuroplasticity and capabilities for continual one-shot learning of hidden spike patterns through neuron construction.

Lei Liu

thesis: Functional Composite Nanocarriers for Traceable Drug Delivery

abstract: The development of nanoscale traceable drug/gene delivery systems is of great significance for modern cancer therapy. In this thesis, a series of novel functional silica or graphitic carbon nitride composite nanocarriers with favourable size, morphology, structure and surface modification have been designed and synthesized for traceable delivery applications. These biocompatible nanocarriers can successfully trace intracellular delivery performances using spontaneous Raman and state-of-the-art surface-enhanced Raman scattering (SERS) technologies with ultra-high sensitivity and non-destructive features.

Saleh Mahmoud

thesis: Parametric Study of Soot in Turbulent Non-Premixed Jet Flames

abstract: This thesis reports soot concentration measurements in a set of six well-characterized, attached, turbulent non-premixed jet flames, burning the same fuel mixture in co-flowing air and at ambient temperature and pressure. The interdependence of soot with flame temperature, and the influences of mixing, turbulence, and buoyancy on soot distributions, are all systematically assessed via instantaneous and planar laser diagnostic techniques. A novel post processing technique associates the soot sheets' width with its soot concentration. The thesis provides significant local and global correlations between soot and aforementioned parameters, as well as high fidelity data to assist in soot model development.

Arash Mir

thesis: A Thermodynamic Approach to Modelling Brittle-Ductile and Localised Failure of Rocks Using Damage Mechanics and Plasticity Theory

abstract: This study presents the development of thermodynamically consistent constitutive models for rocks, using plasticity theory and damage mechanics, to be used in conjunction with numerical simulations. The key macroscopic features of rock deformation and failure, including brittle-ductile behaviour, dilation and compaction and localised failure are successfully captured. A thermodynamic framework is developed to describe the localised failure of geomaterials at the material level. The proposed models are examined against experimental data from drained triaxial tests on rock specimens. Finite element simulations of cylindrical rock specimens are also carried out to investigate the structural behaviour of rock specimens.

Mahdieh Nemati

thesis: Development of Optical Microchip Sensor for Biomolecule Detection

abstract: Optical sensors play a vital role in many applications in today's world. The demand for low-cost and portable bioanalyte detection is a growing area in healthcare and environmental fields, which are restricted by commonly used techniques. Amongst optical sensors, optical interferometry is increasingly popular due label-free detection, facile optical platforms, and low-cost design. Nanoporous anodic alumina (NAA) with the high-surface area has been recently envisaged as a powerful platform combined with reflectometric interference spectroscopy (RIfS) for sensing purposes. This thesis represents a high-sensitive biosensor design combining NAA photonic structures and RIfS for biomedical, food and agricultural applications.

Charles Peter Newland

thesis: Developing a (Semi) Automatic Calibration Procedure for Cellular Automata Based Land-use Models

abstract: Cellular Automata (CA) based land-use models are used to understand the wide-ranging impacts that land-use changes have on a region. Given the availability of generic modelling platforms, research focus has shifted from development to application, with a particular focus on calibration. As such models are traditionally calibrated manually, which is time-consuming and lacks objectivity, there is a focus on making the calibration process automatic. The primary objective of this research is to develop improved automatic calibration methods for CA based land-use models, using an optimisation approach, a process-specific approach, and a hybrid approach that combines these two approaches.

Nghiep Nam Tran

thesis: Optimization of the production of biodiesel from recycled grease trap waste

abstract: Grease trap waste (GTW), which is collected from the interceptors installed in the sewage system of commercial businesses, such as restaurants and food processors, appears to be a potential feedstock since it possesses a high lipid content which can be used as a feedstock for biodiesel production. The aim of this study was to develop a feasible technique for the production of GTW-derived biodiesel utilizing GTW as a feedstock. This will contribute to solving the energy crisis and lowering the environmental impacts as Australia is among the top energy producers and the greatest consumers of non-renewable energy resources.

Nguyen Duc Duong

thesis: Adaptive Reinforcement Learning for Heterogeneous Network Selection

abstract: This thesis deals with the problem of intelligent selection of radio access technologies in heterogeneous wireless networks. More specifically, it addresses some key weaknesses of existing distributed solutions, which make them inefficient and not suited for practical deployments. The thesis proposes a range of novel reinforcement learning frameworks based on regret minimisation technique, which have been theoretically proved to reach correlated equilibrium solution concept in game theory. Experimental validation have been conducted to demonstrate the performance improvement of the proposed solutions over existing schemes. The proposed approaches are well scalable and generalisable to a wide range of multi-agent optimisation problems.

Sree Pramod Pinapati

thesis: Magnetic Current Inspired Antennas for Wearable Applications

abstract: The thesis holistically contributes to the advancement of body-worn antennas, as crucial components for wireless communication with wearable systems. Firstly, subsidary issues related to the deployment of wearable antennas are addressed, such as contacting and isolation from the body. Then two new designs of wearable cavity antennas which display stable performance under hostile environmental conditions are introduced and experimentally validated. Afterwards, to help specify requirements for frequency reconfigurable antennas, a study is performed to quantify the variation in operating frequency of a typical wearable antenna. Finally, the design of a new low-profile frequency reconfigurable antenna is presented.

Kunakorn Pokalai

thesis: Simulation and Optimisation of Hydraulic Fracturing and Flowback in Unconventional Reservoirs: A Case Study in the Cooper Basin, South Australia

abstract: This thesis presents and discusses the results of a simulation and optimisation of hydraulic fracturing and fluid flow-back process in an unconventional reservoir in the Cooper Basin, South Australia. First a mechanical earth model is constructed and validated with test data. Then, well test was analysed to determine near wellbore pressure loss and the type of leak-off. Furthermore, a 3D hydraulic fracturing model constructed and integrated into a flow simulation model to predict the flow-back after fracturing. Using the integrated simulation, an optimized well trajectory was designed to maximize the gas production from a reservoir with pre-existing natural fractures.

Mengning Qiu

thesis: A Software Tool for Assessing the Performance of Water Distribution System Solution Methods Based on Graph Theory

abstract: This research investigates the relationships between the performance of different steady-state demand-driven water distribution system (WDS) solution methods and the graph properties of different WDS networks using a newly developed WDS simulation testbed, called WDSLib. The objective is to better understand the influential factors in the performance of different WDS solution methods and to provide information on the determination of a preferable algorithm or combination of algorithms on a particular WDS network under a particular simulation setting based on the graph properties of the WDS network.

Nima Sedaghatizadeh

thesis: The effect of unsteady flow on wind turbine wake development and noise generation

abstract: Owing to the potential of wind energy, it is anticipated that by 2050, approximately 20% of the global electricity to be supplied by wind farms. Thus, it is vital that the possible impact of wind turbines on human health and environment be better understood. One of the main reported drawbacks of wind turbines, is the aerodynamically generated noise due to the interaction of the rotating blades with flow. This study aims to develop an understanding of the wind turbine wake parameters and noise generation mechanisms which will lead to the development of appropriate layout design and noise mitigation strategies.

Exequiel Manuel Sepúlveda Escobedo

thesis: Quantification of Uncertainty of Geometallurgical Variables for Mine Planning Optimism

abstract: In this PhD work, new methods were developed to quantify geometallurgical uncertainties and to enrich the block model with geometallurgical variables, which can contribute to improved optimisation of mining operations. Non-linear regression models by projection pursuit were built to predict grindability indices and recovery. New multi-objective optimisation formulations for block caving mining were derived and solved with the focus on maximising the project revenue and minimising several risk measures. A novel clustering method was developed for geometallurgical domaining and the concept of geometallurgical dilution was introduced and used for the optimisation of the production schedule in an open-pit case study.

Nataliia Sergiienko

thesis: Three-Tether Wave Energy Converter: Hydrodynamic Modelling, Performance Assessment and Control

abstract: This thesis focuses on the performance improvement of a bottom-referenced fully submerged point absorber wave energy converter, by means of a three-tether mooring configuration. The main contribution is made towards modelling, performance assessment and control of the converter in order to answer three research questions: what distinctive features of fully submerged wave energy converters can be utilised to increase their power absorption efficiency; how geometric parameters of the converter, such as the tether arrangement, shape, and aspect ratio affect the system performance; and what factors influence the practical implementation of the optimal control strategies on the three-tether wave energy converter.

Vu Duc Van

thesis: A Kinematically Enhanced Constitutive Model for Progressive Damage Analysis of Unidirectional Fiber Reinforced Composites

abstract: A new three-dimensional continuum approach is developed for modelling the nonlinear behaviour of unidirectional fiber reinforced composite (FRC) lamina. Closed-form analytical expressions based on kinematical enhancements are derived to incorporate both fiber and matrix constitutive responses into the overall ply response. In conjunction with this, a thermodynamics-based model coupling damage and plasticty is developed to capture the nonlinear response of the matrix. To account for the fiber-matrix interfacial debonding, an anisotropic damage model is developed for the directional dependence of the softening response in FRC ply. Assessments against analytical and experimental results show the potential of the proposed approach.

Houzhi Wang

thesis: Initiation of smouldering combustion in biomass

abstract: Smouldering combustion is a slow and low-temperature form of combustion, which often occurs in wildfires. Smouldering combustion poses a potential fire hazard, as smouldering can transition to flaming combustion. There is a lack of understanding of smouldering combustion of biomass, which limits the ability to locate and predict smouldering combustion in wildfires. This work investigated the initiation of smouldering in a biomass fuel bed and the effects of controlling factors on smouldering combustion through experimentation. The required conditions for initiating smouldering combustion in a biomass fuel bed were identified in this research.

Jie Wen

thesis: An Analytical Model for Two-layered Composite Beams with Partial Shear Interaction Based on a Higher Order Beam Theory

abstract: A composite beam having two material layers is commonly used in construction industry to enhance its overall performance due to a proper utilization of two layers. An exact analytical solution based on a higher order beam theory has been developed to accurately predict the static bending response, flexural free and forced vibration response, and geometric nonlinear static flexural of two-layered composite beams with partial shear interaction. Numerical examples of composite beams have been solved by the proposed analytical model to show its performance, which also produced a large number of results which will serve as valuable benchmarking solutions.

Ruiting Yang

thesis: Beam Space Signal Processing for Directional Transmission Phased Arrays

abstract: Beam space (BS) processing is a spatial signal processing technique using beam output data. In this way, advanced optimum spatial signal processing algorithms can be applied when the element outputs are not accessible. Several beam space processing techniques are developed in this thesis.New BS processing formulae are derived for the scenario where relatively narrow beams are directionally transmitted and received and then scanned over a given sector of interest. The properties of directional transmission BS processing are investigated. Techniques for DOA estimation for coherent signals in the omni-directional and directional transmission BS cases are developed.

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