2018

GRADUATION CEREMONIES

THE UNIVERSITY OF ADELAIDE

THE UNIVERSITY
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.

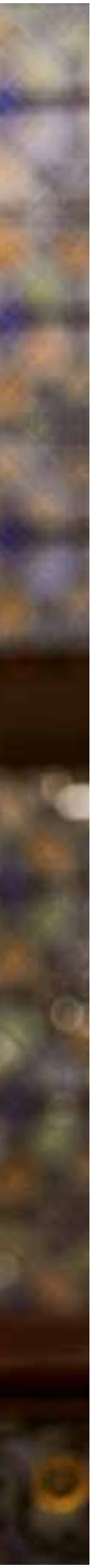
You should be proud today of your achievement in completing your studies, which is the first step on what I trust will be a satisfying and exciting career.

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.

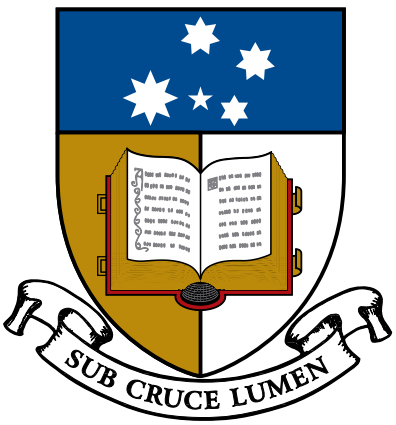
Professor Peter Rathjen
BSc (Hons) (Adel), DPhil (Oxon), Hon DLitt (Tas)
Vice-Chancellor and President

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.

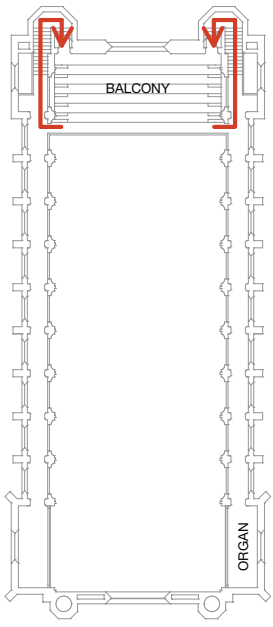
The emergency assembly point is on Goodman Lawns, west of the hall.

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.

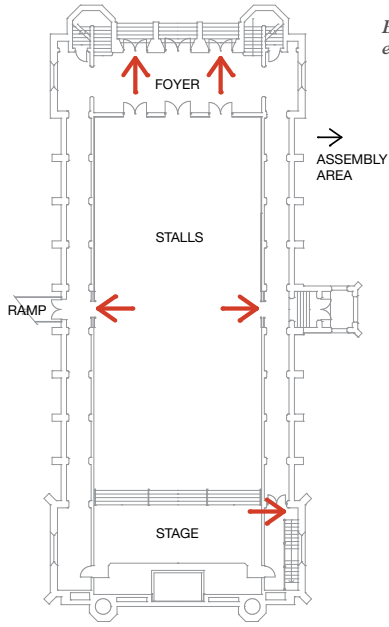
ADDITIONAL INFORMATION

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 Deputy Vice-Chancellor and Vice-President (Academic)
- 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 Mr Andy Keogh

THE MACE BEARER THANKS THE ORATOR
Dr Naomi Marie Tucker will thank the orator

CERTIFICATION STATEMENT by the Deputy Vice-Chancellor and Vice-President (Academic) Professor Pascale Quester DESCAF, M.A. (OSU), PhD (Massey), FAMI

PRESENTATION OF AWARDS by Faculty/School

VALEDICTORY ADDRESS given by Miss Meredith Therese Lane

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, MATHEMATICAL AND COMPUTER 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 Sciences

Matthew Chun Hei KoApplied Mathematics

Degree of Bachelor of Mathematical Sciences (Advanced)

Ashley Grace Dennis-Henderson

Degree of Bachelor of Computer Science (Software Engineering)

Guoliang Min

Degree of Bachelor of Computer Science

Daniel Oliver Arkun

Jason David Beaton

Simon James Gray

Wentao Hong

Jijin Pavithran

Dinh Quoc Thong Le

Lee Se Beng Louis

Jinxuan Li

Christopher Luke Lyndon

Marcel Francesco Porrovecchio

Jarrah Rushworth-Nott

Andrew Mark Skeklios

Jiashi Song

Daniel Max Subic

Thien Tran

Kelsey Lauren Wagner

Yuting Yang

Zhou Yu

Katon Akhmad Zaky

Degree of Bachelor of Computer Science (Advanced)

Rachel Louise Anderson

Brock Angus Campbell

Robert John Gillham

Hin Tran

Honours Degree of Bachelor of Mathematical Sciences

Derek Tak-Cheung Hung

Honours Degree of Bachelor of Engineering

Christopher Wade Carson ..... Software Engineering

Marc Elvin Farmer ..... Software Engineering

Stuart Foid..... Software Engineering

Jozsef Kepes..... Software Engineering

Meredith Therese Lane ..... Software Engineering

Zetong Wang..... Software Engineering

Degree of Master of Software Engineering

Sangyeol Kim

Chenzhang Li

Yuanzhong Xia

Degree of Master of Computing and Innovation

Xiaoshan Chen

Devi Sambasiva Rao Goli

Junjie Guo

Ke Hao

Pu Hou

Neelam Lakshmana

Kin Leong Lee

Yingxue Li

Zhaochen Li

Biyu Liu

Lu Liu

Boyu Mao

Ruizhi Ni

Sichen Wan

Siyuan Wang

Ze Wang

Tianyu Wu

Qiwen Yang

Rui Yao

Tianming Zhang

Degree of Master of Computer Science

Chao Lu

Jingwen Shan

Masatoshi Takada

Shuo Yan

Degree of Master of Philosophy

Jordan Cirocco Belperio

thesis: Flows through Helical Pipes with Elliptic Cross Sections

abstract: Flows through helical pipes are important in many applications, such as blood flow through the coiled veins and arteries of an umbilical cord, and flow through industrial heat exchangers and reactors. This research examines flows through helical pipes with elliptic cross-sections. Steady and unsteady flows are investigated through these geometries using the finite-element library oomph-lib. Flow through elliptical cross-sections is usually a distortion of flow through circular cross-sections. At low Reynolds and Strouhal number, steady results can be used to predict time-averaged unsteady results, which allows for simple predictions using empiricial data.

Vanessa Grace Glenny

thesis: A methodology for predictive topic modelling; or, any excuse to watch Love Actually

abstract: With the rise of big data, and given the complex nature of human language, we are often looking for ways to meaningfully summarise information contained in large amounts of text. Topic models provide a method with which we can concisely summarise text while retaining semantic information. However, these models have mainly been applied to machine learning problems, with little emphasis on prediction. This thesis provides a statistical framework for prediction from text using topic models as a data reduction method, and the topics themselves as predictors, with a focus on the effect of supervised learning and incorporating document structure.

Yuchao Jiang

thesis: Sketch Image Recognition Using Deep Features

abstract: In this thesis, we present systems for sketch classification, as well as face sketch and photo matching. Models using deep convolutional neural networks that consider the unique characteristics of sketches, have been developed and studied for sketch classification. An end-to-end method has been proposed for matching pairs of face sketches and photos, whereby the similarity score can be obtained directly. Furthermore, in this study, we create a large face sketch dataset, which will facilitate future research. Experiment results on challenging sketch datasets demonstrate the superior performance of the proposed model in comparison to previous, state-of-the-art methods.

Parsa Kavkani

thesis: Lifting Bundle Gerbes and Central Extensions of Gauge Groups

abstract: Central extensions of groups play an important role in quantum mechanics. Depending on topological properties of a group it can be difficult to construct a central extension. We have given a general method to construct central extensions of one-connected Lie groups using differential forms and have applied this method to the case of groups of maps and also gauge groups. The theory of bundle gerbes (invented by Murray) is used to construct a de Rham three-form obstructing the lift of a principal bundle to a central extension.

Degree of Doctor of Philosophy

Peter Geoffrey Ballard

thesis: Epidemic fade-out in the Markovian SIR-with-demography infection model

abstract: This thesis examines epidemic fade-out, the situation in which an infection dies out after an initial major wave of infection, in the Markovian SIR-with-demography model. An efficient method for calculating the probability of epidemic fade-out is presented. It is shown that this probability has a non-monotonic relationship with the transmission rate, often having a local maximum when the basic reproduction number, R0, is approximately 2. Two strategies, one optimal, one simple yet nearly optimal, are presented for controlling the transmission rate in order to maximise this probability. Finally, the results are extended to time-dependent models.

Christopher Edward Davies

thesis: On Group-based Trajectory Modelling

abstract: Group-based trajectory models are used for characteristics that, when followed longitudinally, may show subpopulations with distinct trajectories. This thesis provides guidance in the use of these models for practising statisticians, focusing on the choice of covariance structures, the impact and identification of outlying trajectories, and the most appropriate methods for estimating the effects of covariates. Researchers should consider a wide range of models, and bearing in mind the assumptions they make, carefully choose that which fits best with the data.

Saber Dini

thesis: Spatial Quantification and Mathematical Modelling of Tissue Development

abstract: In this thesis, we aim to improve our understanding of tissue development by i) quantifying the distribution of cells in tissues, and ii) modelling cell interactions that influence formation of tissue patterns. Towards this end, we have introduced a method of quantifying the spatial arrangement of cells in tissues using pair-correlation functions (PCFs), and developed continuous and discrete mathematical models to simulate the underpinning mechanisms influencing cell aggregation in tissue development. Our approach provides a novel means to gain more comprehensive insights into tissue development, by analysing the biological data along with simulating the underpinning mechanisms.

Qichang Hu

thesis: Dynamic Scene Understanding with Applications to Traffic Monitoring

abstract: The problem of dynamic scene understanding involves simultaneously solving several sub-tasks including object detection, recognition and tracking. This thesis aims to investigate dynamic scene understanding in traffic scenes. This thesis develops algorithms that are able to detect and recognize the objects of interest in street view images, from road signs, cyclists and pedestrians, to vehicles. By employing deep learning techniques, a vehicle identification system is also proposed to obtain fine-grained vehicle attributes, including brand, model, colour and year of manufacture. This type of information is critically useful in traffic monitoring and video surveillance.

Hui Li

thesis: Text Detection and Recognition in Natural Scene Images

abstract: This thesis addresses the problem of text spotting in natural scene images via deep neural networks. Text spotting aim to detect text regions using bounding boxes, and recognize the corresponding sequence of characters. We start from a special case of text, namely spotting car license plate, and then extend to general scene text. For both tasks, we develop two approaches respectively: a stepwise one and an integrated one. The stepwise methods tackle text detection and recognition step by step by respective models; while integrated methods handle both text detection and recognition simultaneously via one end-to-end trainable model.

Mohd Mahayaudin bin Mansor

thesis: Directionality in Time Series and Its Applications

abstract: A suite of seven statistics to detect directionality in time series is presented. Applications from various disciplines including business, environmental science, finance and medicine are considered. Models that allow for directionality are proposed, and methods of fitting these models are investigated. Time series models that incorporate directionality provide more precise prediction limits and more realistic simulations than the models that do not. Potential practical applications include: providing evidence to support physical interpretations; directionality trading rules for investment portfolio; prediction of unstable financial periods; and possible early warning of epileptic seizures.

Ruizhi Qiao

thesis: Mid-level Representations for Action Recognition and Zero-shot Learning

abstract: This thesis investigates the mid-level representations of visual objects and focuses on learning and improving mid-level representations for boosting the performance of action recognition and zero-shot learning. To achieve this goal, this thesis proposes the following approaches. A representation suitable for characterizing human actions based on a sequence of 3D skeleton coordinates is learned for action recognition. A simple yet effective zero-shot learning method that is capable of suppressing noise in the text is designed. A strategy to re-align the distributed word embedding with visual information for improving zero-shot learning is proposed.

Nicolas Peter Rebuli

thesis: Hybrid methodology for Markovian epidemic models

abstract: In modeling the spread of an infectious disease through a population of individuals, it is common to adopt a continuous-time Markov chain framework due to its balance between realism and mathematical-accessibility. However, analysing such a model is generally computationally-infeasible if the population size is large. We present a novel hybrid framework which captures the essence of the continuous-time Markov chain framework, but enables one to analyse large populations of individuals. We also investigate an approach to reducing systematic bias in estimates of the basic reproductive number, based on data from the first few weeks of an outbreak of a disease.

David Matthew Skene

thesis: Mathematical modelling of overwash on low freeboard bodies by water waves

abstract: A simplified mathematical model of water waves washing onto (i.e. overwashing) a zero freeboard step and floating elastic plate is developed. The investigation is motivated by experiments of how waves interact with floating elastic plates - the canonical model for how ocean waves interact with sea ice. These experiments have found that when overwash occurs it creates a significant and previously unaccounted for reduction in wave transmission. The simplified mathematical model is able to account for this reduction in wave transmission using energy conservation techniques and can be deployed within the framework of existing wave/floating plate mathematical models.

Carmine Christopher Wainman

thesis: Controls on the Geometry, Stratigraphic Distribution and Quality of Coals of Middle to Upper Jurassic Strata in Eastern Australia

abstract: Middle and Upper Jurassic strata of eastern Australia contain major coal seam gas resources. CA-TIMS dates show that the Walloon Coal Measures are predominantly of Upper Jurassic age rather than Middle Jurassic as previously believed. Much of the strata of the Surat Basin were deposited at high palaeolatitudes in a low-gradient fluviolacustrine setting with rivers flowing to the south-southwest from the New England Orogenic Belt. Sedimentary structures indicative of tidal influence in association with dinoflagellates suggest a few episodes of marine transgression. Frequent and rapid climate change probably account for the thin laterally discontinuous nature of the coal beds.

Junhua Wu

thesis: Exact and Heuristic Approaches for Multi-component Optimisation Problems

abstract: The research presented in this thesis focuses on the optimisation of modern complex systems that consist of multiple subsystems interacting or depending on each other, such as Wave Energy Converters in a farm or the route and packing planning in a delivery system. We pay special attention to a benchmark problem named the Travelling Thief Problem, on which we conduct theoretical and empirical investigations in order to push forward the cutting-edge methodology of the optimisation of such complex systems. We design and propose novel exact, heuristic and hybrid approaches on the problem which achieve high performing results.

Bohan Zhuang

thesis: Towards Efficient Deep Neural Networks with Applications to Visual Recognition

abstract: This thesis addresses a number of important practical problems in learning energy-efficient deep networks and compact visual embedding, in learning object categories from noisy annotations, and in learning interactions between visual objects. All methods are validated through rigorous and extensive empirical assessment, comparing favourably to competing approaches, often by a substantial margin.

Faculty of

SCIENCES

Presented by the Interim Executive Dean of the Faculty of Sciences, Professor Michael Liebelt BSc, BE(Hons), MEngSc, SMIEEE, FIEAust

Degree of Bachelor of Viticulture and Oenology

Richard Paul Baker

Laura Kate Blissenden

Yifei Guan

Hongyu Guo

Sarah Loraine Bridson Lyons

Degree of Bachelor of Science (Veterinary Bioscience)

Oliver Angus Nelmes Wilkie

Degree of Bachelor of Science (Space Science and Astrophysics)

James Alexander Knowles ..... Experimental and Theoretical Physics

Degree of Bachelor of Science (Natural Resources)

Sara Yahya Ismail Al Balushi

Daniel Peter Mills

Shannon James Robertson

Degree of Bachelor of Science (Nanoscience and Materials)

Taylor Sebastian Wauchope ... Chemistry double major

Degree of Bachelor of Science (Mineral Geoscience)

Nicholas James Powell

Kevin Jing Shen Tay

Degree of Bachelor of Science (Marine Biology)

Sophie Deborah Louise Dolling

Timothy Michael Lang

Tegan Marie Lee

Lokugan Hewage Vinuri Yasara Silva

Degree of Bachelor of Science (Biotechnology)

Aishah Idris ..... Biochemistry and Genetics

Nur Syuhada Khairil Anwar ..... Biochemistry and Microbiology and Immunology

Degree of Bachelor of Science (Biomedical Science)

Furdosa Mohamedzen Ababor ..... Microbiology and Immunology

Jacob Stephen Courtidis ..... Biochemistry and Microbiology and Immunology

Meng Wai Billy Lei ..... Biochemistry and Microbiology and Immunology

Kathryn Mah ..... Genetics

Ida Ayu Jineswari Mas ..... Genetics and Microbiology and Immunology

Jasmine Shu Chern Ong ..... Microbiology and Immunology and Physiology

Praveena R G Chandrasegaran ..... Biochemistry and Genetics

Adilla Nisyyah Razali ..... Genetics and Microbiology and Immunology

Truong Thi Hong Van ..... Biochemistry and Microbiology and Immunology

Degree of Bachelor of Science (Animal Science)

Mark Clifford

Sarah Kate Cracknell

Lauren Ella Dolman

Matthew Jason Grycewicz

Laura Joy Harris

Parris Constance Jeffries

Vasilli Kasimov

Ella Rae West

Degree of Bachelor of Science

Husna Humaid Shamis Humaid Al-Salmi ..... Ecology and Spatial Science

Tamika Emily Jade Burrowes ..... Genetics and Microbiology and Immunology

Kieran Peter Butler ..... Geophysics and Applied Geology

Yen You Chew ..... Chemistry double major

Jane De Leon ..... Geology and Geophysics and Applied Geology

Chelsea Marie Falco ... Microbiology and Immunology

Benjamin Eric Fordham ..... Chemistry and Genetics

Robert Brett Gerschwitz ..... Chemistry double major

Dylan Thomas Gordge ..... Ecology and Spatial Science

Emily Jane Grayson ... Ecology and Evolutionary Biology

Thi Kim Huynh ..... Psychology and Zoology

Adrian Ip ..... Chemistry double major

Mark Robert Mannix ..... Botany and Soil Science

Geoffrey Paul McNulty ..... Theoretical Physics

Niall Mitchell ..... Geology and Geophysics and Applied Geology

Kate Emily Neadley ..... Biochemistry and Physiology

Winona Faye Onglao ... Biochemistry and Microbiology and Immunology

Alketas Spyridon Patounas ..... Geology and Geophysics and Applied Geology

Charlotte Emily Austra Renigers ..... Chemistry Double Major

Sarah Sevastidis ..... Chemistry

Mia Smudic ..... Microbiology and Immunology

Josh Craig Watson ..... Ecology and Geology

Degree of Bachelor of Science (Advanced)

Niamh Herbert

Degree of Bachelor of Food and Nutrition Science

Max Nicholas De Sciscio

Ho Cheng Koc

Ashleigh-Kate Schneider

Degree of Bachelor of Applied Biology

John Andrew Ricciotti

Degree of Bachelor of Agricultural Sciences

Joseph James Daniel

Brittny Rose Heslop

Minshu Liang

Xueying Liang

Jingqiu Lou

Zehao Wang

Enqi Wu

Xihe Zhang

Wenrui Zhao

Honours Degree of Bachelor of Viticulture and Oenology

Sacha Alaine Clifton

Ziyi Han

Yunqi Yan

Honours Degree of Bachelor of Science

Thomas Charles Almond ..... Chemistry

Benjamin John Blaschek ..... Geology

David Stanley Bleckly ..... Ecology and Environmental Science

Judd Elmawey ..... Ecology and Environmental Science

Nicole Caitlin Harrison ..... Animal Science

Chloe Mitchell ..... Animal Science

Max Carlton Peters ..... Animal Science

Tara Jodie Smale ..... Animal Science

Andrea Donné Stiglingh ..... Soil Science

Stephanie Lee Strange ..... Ecology and Environmental Science

Ellen Lillian Swan ..... Chemistry

Sophie Alexandra Ward ..... Animal Science

Nestor Adam Wyra ..... Geology

Graduate Diploma in Viticulture and Oenology

Hanyu Lin

Samuel James Smith

Degree of Master of Viticulture and Oenology

Kiranpreet Kaur

Zihao Liang

Geridi Qi

Lin Sun

Shanshan Wu

Wei Xiong

Wenjing Zhang

Degree of Master of Biotechnology (Biomedical)

Emmanuel Asuncion

Zixuan Cheng

Yanping He

Eun-Bi Lee

Rajal Umang Patel

Degree of Doctor of Veterinary Medicine

Oliver Angus Nelmes Wilkie

Degree of Master of Philosophy

Natasha Jade Atkins

thesis: IceCube's Neutrinos: Galactic or Extra-Galactic?

abstract: We consider whether all of IceCube's neutrinos could be produced within the Milky Way. Assuming that almost all the neutrinos come from the halo of the Milky Way we calculate the overall number density of such Milky Way-like objects in the rest of the Universe and place constraints on the fraction of the IceCube intensity that could be purely from the Milky Way. We then repeat these calculations for different source distributions within the Galactic disk. Under some simplifying assumptions and in light of recent experimental results, the halo and disk of the Milky Way cannot account for all neutrinos.

Deeksha Beniwal

thesis: Mid-Infrared Fibre Lasers for use in Wavefront Correction in Advanced Gravitational Wave Detectors

abstract: We numerically and experimentally developed mid-infrared fibre lasers for wavefront distortion correction in next-generation gravitational wave detectors.A watt-level 2.8um Er:ZBLAN fibre laser was assembled targeting the residual water in interferometer mirrors. This laser generated wavefront deformation in a test mirror well above the requirements for thermal actuation. A steady-state model was developed to optimise 2.8um and 3.5um fibre lasers. Simulations of the experimental lasers indicated significant scaling potential for the 3.5um system. This identified the optimisations that make mid-infrared fibre lasers ideal for wavefront correction in gravitational wave interferometers.

Jake Callum Guscott

thesis: Reliable Statistical Methods and their Applications for Testing Incomplete Multidisciplinary Data

abstract: We present a comprehensive analysis of the left-truncated Weibull, loglogistic, lognormal and Pareto distributions in cases where the parameters must be estimated. The critical values of the Kolmogorov-Smirnov, Kuiper, Cramer-von Mises and Anderson-Darling goodness-of-fit tests are determined via Monte Carlo simulations for a range of sample sizes and truncation levels. These critical values are found to be independent of the distribution parameters and a single function is found which models the sample size and truncation dependence in all cases. We verify the performance of our models via power testing and apply them to analyse financial data from the LSE.

Nicholas Charles Schumann

thesis: Inhibition of Serine and Cysteine Proteases by Peptidomimetic Inhibitors

abstract: Described is the synthesis and biological evaluation of acyclic and cyclic peptidomimetic inhibitors of serine and cysteine proteases. Chapter two discusses incorporation of heterocycles into the backbone of these peptidomimetics to define the geometry known to favour binding to proteases. Chapter three details the design, synthesis and biological evaluation of a library of boronate ester-based peptidomimetic inhibitors of Hip1, a serine protease implicated with a host innate immune response pathway of Mycobacterium tuberculosis. Optimisation of the lead inhibitor lead to a series of potent inhibitors with picomolar range activities.

Stephen Tronchin

thesis: Structure Functions in Medium and the Polarized EMC Effect

abstract: The ratio of the in-medium to free nucleon structure functions for the unpolarized and polarized case is obtained using the bag model, along with the QMC model to incorporate the in-medium modifications. The unpolarized EMC effect is compared to data and the trend found there is certainly reproduced. Our prediction of the polarized EMC effect is found to be almost identical to the unpolarized case. The in-medium modifications; the sigma mean field, Fermi motion, and omega mean field are included in the calculations one at a time to see which modifications play the dominant role in producing the EMC effect.

Degree of Doctor of Philosophy

Mark Gerald Aartsen

thesis: Improved Neutrino Point Source Search Method for IceCube's High Energy Starting Event Sample

abstract: High energy astrophysical neutrinos are cosmic messengers with the potential to reveal the origins of cosmic rays. Neutrino point source searches are key to finding cosmic ray sources. A new form of point source analysis is presented which tests a model combining multiple background hypotheses with a single point source hypothesis. We apply this new analysis to the High Energy Starting Event sample collected from the IceCube Neutrino Observatory. The new analysis is compared to the previous analysis on this sample, revealing biases in the previous methodology. A significant point source contribution is not observed.

Shanika Lakmini Amarasinghe

thesis: Defining Transcriptional Networks Associated with Plant Salinity Tolerance

abstract: Salinity is a major issue for sustainable agriculture worldwide hence, development of salt tolerant crops is needed. Overexpression of the Arabidopsis CIPK16 gene confers enhanced salinity tolerance in Arabidopsis and barley, yet the underlying mechanism of this phenotype is unknown. This project identified several transcription factors and phytohormone signalling components potentially involved in this mechanism. Interestingly, this study established that there is no AtCIPK16 orthologue in barley. This study also showed that allelic variations of HvHKT1;5 and expression differences of HvNHX4 may be responsible for differences in Na+ accumulation in barley under salinity stress.

Zarina Amin

thesis: Biofilm Formation and Virulence of Streptococcus pneumonia

abstract: This research aimed to investigate the influence of the source of clinical isolates of Streptococcus pneumoniae on their biofilm formation phenotype and invasive disease potential. The study identified multiple examples of clonally-related strains that consistently and reproducibly exhibited distinct biofilm phenotypes in vitro and virulence phenotypes in mice that directly correlate with the original site of isolation from human patients. Thus, strains within a clonal lineage can exhibit stable niche adaptation. These findings provide a robust platform for future studies aimed at identifying critical bacterial and host determinants of pneumococcal virulence phenotype.

Jennifer Rose Bellon

thesis: The Development and Evolution of Saccharomyces Interspecific Hybrids for Improved, Industry Relevant, Phenotypes

abstract: This thesis describes a progression of experimental work from proof of concept (ie can laboratory generated interspecific yeast strains be developed for industrial application) through to realisation of the potential of novel interspecific wine yeast for improved outputs in the winery. The research reported establishes that Saccharomyces interspecific hybridisation can deliver tools to the winemaking industry in the realm of wine style differentiation through formation of novel yeast volatile fermentation metabolite profiles, and improved yeast fermentation properties. In addition, adopting an evolutionary approach in a fermentative context can deliver increased fitness to a wine yeast interspecific hybrid.

Alexander John Chambers

thesis: Hadron Structure and the Feynman-Hellmann Theorem in Lattice Quantum Chromodynamics

abstract: Lattice QCD is a vital tool for understanding the low-energy behaviour of Quantum Chromodynamics, including the internal structure of hadrons. Current challenges to the field include the calculation of fermion-line disconnected contributions, and calculations involving high momentum transfers. In this thesis we develop and demonstrate a new technique based on the Feynman-Hellmann relation, which allows observables to be calculated on the lattice through energy shifts induced by an externally-applied field. Results for the electromagnetic structure of the proton in particular will be important inputs for future experimental efforts at the upgraded Continuous Electron Beam Accelerator Facility at Jefferson Lab.

Tom Coleman

thesis: Utilising CYP199A4 from Rhodopseudomonas palustris HaA2 for investigation of the mechanism of cytochrome P450-catalysed oxidations

abstract: This thesis describes work towards elucidating the mechanism of various oxidative reactions catalysed by cytochrome P450 enzymes (P450s). The bacterial P450 enzyme CYP199A4, from Rhodopseudomonas palustris HaA2, is highly selective for substrates with a para substituted benzoic acid framework, and can catalyse varied P450 mono-oxygenase reactions such as hydroxylation, desaturation, heteroatom oxidation and dealkylation. CYP199A4 was employed to provide insight into the mechanisms of various P450-catalysed oxidations, using a range of substituted benzoic acids. These were investigated using substrate turnover and X-ray crystallography, to study mechanisms relevant to the role of this family of enzymes in drug metabolism.

Benjamin James Cooke

thesis: Petrology and Geochemistry of Sangeang Api and Recent Volcanism in The Sumbawa-Flores Sector of The Sunda Arc: The Response of Along-Arc Geochemistry to Subduction Processes

abstract: This research dwells on the cumulate xenolith-rich, active volcano, Sangeang Api and adjacent Quaternary volcanic centres in the Sumbawa to Flores sector of the Eastern Sunda Arc. The xenoliths reveal a multi-tiered magma chamber system spanning the full crustal thickness. The work reveals that ascending and degassing magmas undergo complex variation in their redox state during crystal-melt fractionation, but that primary magmas are already relatively oxidised before they reach the Moho. More regional sampling identified that potassic magma geochemistry is a response to magmatic degassing, mixed source composition and large-scale subduction zone processes.

Antonia Dalziel

thesis: Disease ecology of low pathogenic avian influenza in the Australian environment

abstract: I have examined multiple facets of wildlife disease ecology related to low pathogenic influenza virus in wildlife in Australia. This has included the environmental conditions that contribute to the persistence of low pathogenic avian influenza viruses in water and the potential to spatially predict areas with the highest risk for persistence of virus in water sources; potential exposure and secondary host nature of a sympatric feral mammal species; and a semi-quantitative risk assessment for the transmission of LPAIV from free-living wild birds to captive exotic and native birds in a zoological institution setting.

Hue Thi Dang

thesis: Investigation of Herbicide Resistance in Oriental Mustard (Sisymbrium orientale L.) in Australia

abstract: Sisymbrium orientale has evolved resistance to the triazine herbicides, as well as to diflufenican, picolinafen and 2,4-D in Australia. A target-site resistant mechanism was confirmed endowing resistance to the triazine herbicides (Ser-264-Gly in psbA gene), to diflufenican (Leu-498-Val in PDS gene) and to picolinafen (Leu-498-Val and Glu-425-Asp in PDS gene). In contrast, resistance to 2,4-D was conferred by reduced translocation of herbicide out of the treated leaf. A single dominant gene controlled resistance to each of diflufenican, picolinafen and 2,4-D. No apparent fitness cost was identified in plants carrying either of the mutations in the PDS gene.

Michael Theophilus Dom

thesis: Feeding Value of Sweet Potato and Cassava to Growing Pigs

abstract: Sweetpotato roots and vines and cassava roots are major pig feed resources for tropical farming. Processing and blending with protein concentrates improves palatability and nutrition to pigs, however, nutrient digestion is affected by dietary fibre composition. Furthermore the nutrient requirements of growing pigs fed mixed root-foliage diets were undifferentiated between commercial and local crossbreed pigs. The study determined higher nutrient utilization in growing pigs fed blended diets compared to wheat-based pelleted diet. Fibre digestibility was increased in local pigs, improving their energy utilization and growth performance. Dietary fibre and plant proteins may contribute to local pig nutrition and gut health.

Million Fikreselassie Erena

thesis: Genetic and Physiological Bases of Heat-Induced Floret Sterility in Wheat

abstract: In durum and bread wheat, exposure to heat stress just before head emergence can cause floret sterility (failed grain set) and hence yield loss. Varieties able to maintain fertility under heat stress were identified, offering tolerance sources for breeding. A region on chromosome 2B influencing variation in heat induced floret sterility was defined in a Drysdale x Waagan mapping population. It was separate from grain filling heat tolerance loci. The susceptibility peaked at or just after meiosis and prevented starch accumulation in pollen grains. The tolerance was found to be expressed dominantly, and in a sporophytic manner.

Jacqueline-Alba Fabrizio

thesis: Characterising Novel Substrates of the Asparaginyl Hydroxylase FIH

abstract: This study characterised novel viral proteins as substrates of the mammalian oxygen-sensing enzyme factor inhibiting HIF (FIH). Three orf virus ankyrin proteins were shown to interact with and be hydroxylated on specific aspargine residues by FIH. This interaction in cells sequestered FIH with functional consequences as orf virus infected cells showed upregulation of FIH-regulated target genes. FIH was also found to hydroxylate a novel non-ankyrin substrate, the deubiquitinase OTUB1. These data advance our current knowledge of FIH substrates, is the first characterisation of non-mammalian proteins as substrates of FIH, and demonstrate a role for FIH in viral infection.

Catherine Elizabeth Gibson

thesis: The Expression of Hydrolytic Enzymes in Germinating Barley Grain

abstract: Modification of the barley grain endosperm in germination is fundamental to successful plant growth but also has important ramification in the malting and brewing industries. There are a battery of enzymes that are involved in the modification process but the sites of synthesis and action of only a few have been described. The development of a sensitive and robust non-radioactive in situ mRNA hybridization (ISH) procedure showed that the transcripts of a few of these enzymes are found in various tissues in grain sections of two barley cultivars.

Ali Saleh Hassan Hassan

thesis: Identification of Genes Involved in Biosynthesis of Arabinoxylans, Ferulic and P-coumaric Acid in Barley Grain

abstract: A genome wide association (GWAS) mapping approach was employed to identify genomic regions significantly associated with barley grain arabinoxylan and cell wall bound ferulic and p-coumaric acid levels. For both traits significant associations were identified and putative candidate genes were determined. A BAHD acyltransferase potentially involved in linking p-coumaric acid to other polymers was mapped to a QTL on barley chromosome 7H with the highest LOD score. Deposition of arabinoxylan, ferulic and p-coumaric acids was monitored during barley grain development. Transcript profiles of candidates for biosynthesis of all three compounds were defined, revealing a network of co-expressed genes.

Zhirui Jiang

thesis: Mechanisms of Growth Failure in Mucopolysaccharidosis VII Mice

abstract: This study characterized the mechanisms underlying impaired bone growth in mucopolysaccharidosis (MPS) using mouse models, including the nature and progression of delayed endochondral bone formation, thickened growth plate accompanied with reduced number of proliferative and hypertrophic chondrocytes, disrupted cell cycle progression, and dysregulated endocrine and paracrine signalling pathways. Findings from this thesis expand the understanding of the pathology of impaired bone growth and provide a focus for future development of therapeutic approaches for bone disease in MPS.

Khaled Adnan Khaled Kanakri

thesis: Use of Flaxseed Oil for Sustainable Enrichment of Chicken Meat with Omega-3 Fatty Acids for Human Consumption

abstract: Under certain conditions chickens can convert plant omega-3 from flaxseed oil into fish-type omega-3s and deposit them in the meat. This increases the nutritional value of the meat for consumers but also increases the cost of the feed and so producers have been reluctant to adopt the approach. Work carried out during this thesis has demonstrated ways this approach could be made 9 to 20% more efficient, enhancing the economic viability of using sustainably produced flaxseed oil in poultry diets to increase omega-3 intake by consumers and reducing demand on already over-exploited marine resources.

Mahwish Khan

thesis: Characterization of Metabolic Gene Targets in Response to Chromosomal Instability

abstract: CIN is frequently present in advanced tumours and associated with tumorigenesis. Depletion of nucleotide synthesis candidates altered the level of adenine nucleotides which led to DNA damage which in turn activated PARP for DNA repair, further depleting ATP levels. We found increased numbers of lysosomes in nucleotide deficient CIN cells and if their formation was blocked, CIN cells died, which suggested that autophagy is activated and required for CIN cell survival. Increasing understanding of pathways that make CIN cell survive or die may ultimately allow the design of cancer-specific drug targets for cancer therapy.

Yu Sing Leung

thesis: Living Costs of Ocean Acidification and Warming in Herbivorous Gastropods and their Adaptations

abstract: This thesis examines the influence of ocean acidification and warming on the fitness and survival of common herbivorous gastropods in South Australia and their potential capacity to acclimate to these climate change stressors. The effects of pH and temperature on the energetics, growth, survival and shell properties of gastropods are investigated. Results reveal that subtidal gastropods are minimally affected by ocean acidification, while ocean warming causes substantial impacts on their fitness and survival even at temperature below their thermal tolerance limit. However, intertidal gastropods are robust to ocean acidification and warming due to their physiological, molecular and behavioural adaptations.

Renata Lippi

thesis: Metal-Organic Frameworks as Templates for Highly Active Heterogeneous Catalysts

abstract: This thesis explored the use of Metal-Organic frameworks (MOFs) as sacrificial templates to synthesise highly active nanostructured heterogeneous catalysts and investigated the templating mechanism. A Mn-MOF metalated with Rh and a Zr-MOF impregnated with Ru were used as presursors for CO2 methanation catalysts. The resulting nanostructures structures displayed controlled morphology as characterised by TEM, XPS and PXRD. The MOF-derived Ru/ZrO2 displayed remarkable catalytic activity when compared to a number of controls. In addition, Ce-MOF impregnated with Ru was demonstrated as sacrificial template for a highly active ammonia synthesis catalyst. Templating mechanism was studied via in situ and in operando PXRD.

Jarod Paul Lyon

thesis: Restoration of Fish Populations in Semi-Arid Ecosystems

abstract: Ecological theory highlights the importance of temporal and spatial scale in managing fish populations. However, in heavily modified riverine systems supporting intensive agriculture, the realities of managing across such scale for fish population outcomes is difficult. In Australia's largest and most productive water catchment (Murray-Darling Basin), balancing both agricultural and environmental outcomes is paramount. In this thesis, I present case studies providing lines of evidence on the success of fish restoration programs, and outline processes that frame this evidence of success within a conceptual framework built on restoration theory.

Natalia Magdalena Martin

thesis: Investigating the Role of HIF-1 and HIF-2 Transcription Factors in Multiple Myeloma

abstract: The Hypoxia Inducible transcription Factors (HIFs) influence Multiple Myeloma (MM) disease pathogenesis. This study explored the specific role of HIF-2 compared to HIF-1 in MM disease progression in vivo, using a well-established mouse model for MM. Inducible systems for HIF expression proved unstable in MM cells, so HIF-2a deficient MM cells generated using cutting edge genome editing technology were analysed in the mouse model. The data presented demonstrate that HIF-2 is a critical contributing factor in MM disease progression in vivo, with disease progression dramatically reduced, suggesting that HIF-2 has good therapeutic potential in MM.

Kieran Meaney

thesis: Proterozoic Crustal Growth in the Southeastern Gawler Craton; The Development of the Barossa Complex, and an Assessment of the Detrital Zircon Method

abstract: This thesis addresses the development of the Barossa Complex (BC) on the southeast Gawler Craton, South Australia. The first stratigraphic and structural maps of the BC are presented. Protolithic deposition occurred between 1740-1655 Ma, before high grade metamorphism between 1630-1580 Ma. Hydrothermal fluids infiltrated the BC between 1600-1580 Ma. The geological history indicates the BC is part of the larger Olarian-Isan system. This thesis also addresses detrital zircon in the modern environment. Aeolian zircon identified in stream systems demonstrates that ad hoc accumulation of exotic zircon can produce misleading sediment provenance signatures, which must be considered in detrital zircon studies.

Verity Jayne Normington

thesis: Characterisation of Late Palaeozoic Glacigene Sedimentary Rocks of the Troubridge and Arckaringa Basins and Implications for Palaeogeographic Reconstructions of Late Palaeozoic South Australia

abstract: This thesis illustrates how glacial sediments can be utilised to gain an understanding of the palaeo-geography of an ancient glaciated terrane and how the transported glacigene sediments can be employed as a mineral exploration tool. This thesis presents new sedimentological, geochronological and geochemical data and associated interpretations of the South Australian late Palaeozoic sediments with emphasis on the Troubridge and Arckaringa basins. This new data together with the depositional settings is used in the synthesis of a series of palaeogeographic reconstruct-ions detailing the glacial and post-glacial geographical settings and depositional environments that occurred during the late Palaeozoic in South Australia.

Cristóbal Andrés Onetto Carvallo

thesis: Identity and Physiology of Glycogen Accumulating Organisms in Winery Wastewater

abstract: Glycogen accumulating organisms (GAOs) form part of the core microbial component of the activated sludge community of industrial wastewater treatment plants in which their excessive proliferation is linked to operational problems. Despite this, limited research has focused on their identification and ecophysiology. This thesis investigates the GAOs observed in winery wastewater industrial systems using state-of-the-art molecular and mass spectrometry techniques. Bacteria belonging to the genus Defluviicoccus where classified as the most abundant GAO and low nutrient availability in treatment plants was shown as one of the major factors driving their proliferation.

Janet Caritas Doru Pandi

thesis: Role of sweet potato fibre on energy utilisation, gut morphology, and gut microbiota in broilers

abstract: Common sweet potato varieties from Papua New Guinea were selected. Sweet potato with varying NSP contents supplemented with enzymes were fed to broilers to investigate influences on diet ME, broiler gut health and digestive capacities. ME and digestibility of diets were influenced by the total NSP content. Sweet potatoes with low NSPs had low MEs which improved with addition of enzymes. Morphological traits were unaffected whilst levels of entero-pathogens were influenced. Elevated levels of Campylobacter were associated with enzyme supplementation of sweet potato diets and prolonged feeding. C. Perfringens were low in sweet potato with a low NSP.

Jemma Seyfang

thesis: Birth Litter Sex Ratio Affects Gilt Behaviour, Endocrine Status and Reproductive Performance

abstract: The aim of this thesis was to determine if female pigs born into male biased litters would have impaired reproduction and increased aggressive behaviour compared to those born into female biased litters. This was assumed to be due to the increased androgen exposure that the female fetuses could be subjected to from the increased proportion of males in the litter that synthesis androgens during their fetal development. This project investigated key aspects of reproductive physiology and behavior that can impact gilt selection into the breeding herd, gilt retention and animal welfare.

Camilla Cecilie Søerensen

thesis: Improving Geological Interpretations from Airborne Electromagnetic Models

abstract: This thesis examines methods for optimising geological interpretations made from airborne electromagnetic (AEM) models. It considers the effect of the pre inversion processing of AEM data and the choice of inversion settings on derived conductivity models and their geological interpretation. Common AEM standardisation methods are summarised and examples of their application to AEM data are provided. An example of how standardised systems can be used to map spatio-temporal variations in a floodplain setting is also given.

Finn McInnes Stokes

thesis: On the Structure of Nucleon Excited States in Lattice QCD

abstract: The structure of nucleon excitations is investigated through lattice QCD. The connection between centre clusters in local Polyakov loops and the confinement of quarks is explored, focusing on visualisations of their evolution in HMC simulation time. This is followed by the presentation of the parity-expanded variational analysis (PEVA) technique, a novel technique for robustly isolating baryons at finite momentum. The PEVA technique is applied to the calculation of the Sachs electric and magnetic form factors of the ground state nucleon and three localised excitations, providing the world's first look at the structure of excited nucleons in lattice QCD.

Georgina Maree Sylvia

thesis: Sensing in Biological Systems

abstract: Metal ions are critical to a range of mammalian cell functions, and small changes in metal ion homeostasis can have a significant effect on cell health. Fluorescent chemosensors, in combination with specialised imaging technologies, have been used to study the role of metal ions in cellular processes. Photoswitchable fluorophores, which can be turned “”on”” and “”off”” using light, present with the added opportunity for reversible analyte binding. This thesis describes the chemical functionalisation of one such photoswitchable fluorophore, spiropyran, in order to improve sensor fluorescence intensity, develop selective metal ion sensors and investigate structure-metal ion selectivity relationships.

Houng Huy Taing

thesis: Mouse Mast Cell Protease 4 Protects Against Ultra Violet-B Induced Skin Tumourigenesis

abstract: Excessive exposure to ultraviolet-B (UVB) radiation is a major etiological factor for skin cancer. Using multiple in vivo mouse models, the current study has established a novel protective role for mast cells (MCs), a group of immune cells initially thought to promote inflammation and deliver deleterious pathological outcomes; and the MC-derived mediator, mouse mast cell protease 4 (mMCP4), against the development of chronic UVB-induced skin carcinogenesis. Further studies also revealed the underlying mechanism for this tumour suppressive role of mMCP4, as well as identified further direct or indirect targets of mMCP4 that facilitates its anti-tumoural functions.

Naomi Marie Tucker

thesis: Metamorphic and Crustal Evolution of Australian-Antarctic Proterozoic Margins

abstract: The Musgrave-Albany-Fraser-Wilkes Orogen (MAFWO) is outstanding in its record of regionally expansive, prolonged and thermally extreme conditions during the Mesoproterozoic, yet precise details of its metamorphic evolution are unclear, and a metamorphic framework for the orogen in its entirety is non-existent. This thesis presents an integrated metamorphic, geochronological, geochemical and isotopic study of two key and understudied tectonic regions at opposing ends of the MAFWO, and in light of these new constraints, reappraises the current state of knowledge of regional, long-lived, high-thermal gradient metamorphism allied with Proterozoic Australian-East Antarctic continental assembly.

Patrick van Bodegom

thesis: Remote Sensing of Clouds with Longwave Infrared Cameras at the Pierre Auger Observatory

abstract: Knowledge of atmospheric conditions at the site of a cosmic ray observatory is important. At the Pierre Auger Observatory in Argentina, an extensive network of meteorological instruments is dedicated to atmospheric monitoring, several of which are used for the remote sensing of night-time clouds.Clouds can be identified passively from the thermal radiation they emit, and four infrared cameras operate as cloud monitors at the Observatory. In this dissertation, I present the methods used to calibrate our cameras and identify clouds in our thermal images. These techniques have been reproducible, and could perhaps benefit other researchers in this field.

Zeyu Xiao

thesis: Hypoxia and Cell Death in Grape Berries (Vitis vinifera L.)

abstract: Grape berry internal oxygen concentration was measured using an oxygen micro-sensor. Berry and seed respiration and lenticel size and function in oxygen uptake of berry pedicels were investigated. Air spaces within berries were visualized using x-ray micro-CT. Factorial trials in the field tested the effects of drought and heat stresses on berry oxygen profiles and cell death. Mitigation strategies for berry cell death and berry shrivel were tested. Data from this study provides basis for further research into roles of berry gas exchange during development and cultivar selection for adapting viticulture to a warming climate.

Wenying Zhu

thesis: Regulation of Sphingosine Kinase 1 Oncogenic Signalling by Calcium and Integrin Binding Proteins

abstract: SK1 is a critical lipid enzyme that promotes oncogenesis. The oncogenic function of SK1 relies on its localisation to the plasma membrane, which is regulated by its interacting proteins CIB1 and CIB2. In this study, I found that, by promoting the plasma membrane localisation of SK1, CIB1 can direct drive neoplastic transformation and it acts as a downstream mediator of Ras-induced oncogenesis. On the contrary, CIB2 blocks the agonist- and oncogene-induced relocalisation of SK1 to the plasma membrane and it acts as a tumour suppressor in ovarian cancer. I also characterised the SK1-CIB1 interaction and demonstrated its regulation by PKD2.

Additional AWARDS

FACULTY OF ARTS

Diploma in Arts

Rachel Louise Anderson ..... Linguistics

Degree of Bachelor of Arts

Emily Jane Grayson ..... Classics

Kate Emily Neadley ..... French

FACULTY OF ENGINEERING, COMPUTER AND MATHEMATICAL SCIENCES

Honours Degree of Bachelor of Engineering

Charlotte Emily Austra Renigers ..... Chemical Engineering

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