

Playford Trust



Annual Review 2019

The Playford Memorial Trust supports high-achieving South Australian tertiary students studying in areas of strategic importance to the State

From the Chair: 2018 in review



2018 marked 35 years since the Playford Memorial Trust began contributing to South Australia's research and knowledge base by providing scholarships and internships for high achieving tertiary students.

The organisation continues to thrive and expand its reach and value. In fact, we have achieved a number of significant records:

- Our **partner list** topped 26.
- Our **non-government partners** will contribute **\$180,000** to our pool of scholarship funding this financial year.
- **New partners** alone are currently contributing **\$56,000** between them.
- More than **\$470,000 in scholarships, internships and awards** was distributed in the year to 30 June 2018.
- The Trust supported **82 students** last calendar year. We awarded **48 scholarships and awards**; continued to support a further **12 PhD students** at the three major universities; and **22 students undertook defence and STEM internships** through our partnership with the former Department of State Development.

- We received about **190 applications** for scholarships and awards, far more than in previous years. This is testament not only to the prestige associated with winning a Playford Trust award, but also to the effectiveness of the Board's communications and marketing.

Three new organisations joined our growing list of partners, between them making possible an additional eight new scholarships. Nyrstar of Port Pirie has funded four scholarships in engineering for 2019, with the offer of paid work experience at its smelter during university vacations; national engineering consulting company, Aurecon, has offered a fourth-year engineering scholarship aimed at women; and Open Gardens South Australia committed to three awards for TAFE SA students undertaking horticultural or environmental management studies.

Our achievements in 2018 were certainly not all about numbers. The development and implementation of a new online system has made it easier for students to apply for scholarships – and for the members of our Scholarship Committee to assess them. Our website received a make-over and our relatively new electronic newsletters spread our students' stories and reduced the Trusts' costs. Several months ago, we teamed up with not-for-profit donations platform GiveNow to ensure that our supporters could make donations online – one-off or regularly – easily and securely.

All of these achievements are in no small measure due to the fine work of our support staff, Mary Anne Fairbrother and Vicki Evans, and the countless hours of unpaid work contributed by members of the Board.

I take this opportunity to thank all of them most sincerely.

Sadly, we lost one of our illustrious members during the year. Danny Watson, Chair of the Investment Committee and long-time Trust member, died in July (see story below). His contribution to the Trust over almost a decade was immensely valuable, and on behalf of the Board I salute him. Our new Board member is Jacqui McGill, most recently a senior executive at BHP, who we welcome formally on page 16.

The primary purpose of this Annual Review is to shine a spotlight on the achievements of current and past Playford Scholars. Their stories make particularly illuminating and interesting reading, and I hope you enjoy them. On page three, we announce the winners of our 2019 university awards – 44 outstanding students with enormous potential. The accomplishments of all the Playford Scholars featured in the following pages are laudable and should serve to reassure us all that the future of this great State is in very good hands.

The Hon Dean Brown AO
Chairman

COVER

2016 Flinders University/Playford Trust PhD Scholar Olivia Davies on the hunt for bees to support her research into parasites. See story page 14.

Vale Danny Watson

It is with great sadness that we pay tribute to long-serving Playford Trust Board member, Danny Watson, who died on 4 July 2018 after a short illness.

Danny had been a dedicated and enthusiastic member of the Board since 2009, serving with distinction as Chairman of the Investment Committee for all of that time. He was a sharebroker by profession and Chairman of Day Cutten Ltd prior to its acquisition by The Macquarie Bank Group.

After retiring, he acted as financial advisor to a number of boards. He was Chairman of The Mary Potter Foundation and a member of the Investment Committee of Minda Inc.

He was also a member of a number of industry bodies and had served as a panel member on the Disciplinary Tribunal of The Australian Securities Exchange and as a Trustee/Director of NGS Super, an industry superannuation fund focused on the non-government school sector.



Congratulations to our 2019 Scholarship Winners

The winners received their Awards at a ceremony at
The University of Adelaide on Wednesday 10 April 2019.

Playford Trust



Playford Trust Regional Science & Engineering Scholarships

Breigh Angove | Bachelor of Education, (Secondary), Bachelor of Science | Flinders University

Nicholas Graham | Bachelor of Science (Honours) (Enhanced Program for High Achievers) | Flinders University

Clayton Parker | Bachelor of Engineering (Honours) (Robotics) | Flinders University

Rebecca Pedler | Bachelor of Science (Honours) (Enhanced Program for High Achievers) | Flinders University

Jonte Reilly | Bachelor of Science (Space Science and Astrophysics) | The University of Adelaide

Henry Rogers | Bachelor of Science (Space Science and Astrophysics) | The University of Adelaide

Adelaide Hills Council / Playford Trust Scholarship

Oliver Russell | Bachelor of Science (Honours) (Geography) | Flinders University

Chartwells / St Ann's College / Playford Trust Residential Scholarships

Thomas de la Perrelle (Continuing Student) | Bachelor of Engineering (Honours) (Mechanical) with Bachelor of Science | The University of Adelaide

Lachlan Ryan (Commencing Student) | Bachelor of Engineering (Honours) (Mechanical and Sustainable Energy) | The University of Adelaide

Aurecon/Playford Trust Electrical Engineering Scholarship

Ashleigh Chin | Bachelor of Engineering (Honours) (Civil, Structural & Environmental) | The University of Adelaide

AusIMM / Playford Trust Minerals Industry Scholarships

Ainsley Bosch | Bachelor of Engineering (Honours) (Mining) | The University of Adelaide

George Symonds | Bachelor of Science (Advanced) (Honours) (Geology) | The University of Adelaide

Adam Zanardo | Bachelor of Engineering (Honours) (Petroleum and Mining) | The University of Adelaide

Codan / Playford Trust Scholarship

Joshua Fuller | Bachelor of Engineering (Honours) (Electrical and Mechatronic) | University of South Australia

Fay Fuller Foundation/Playford Trust Honours Scholarship in Health Sciences

Taylor-Jade Woods | Bachelor of Medical Science (Honours) | Flinders University

GSA / Playford Trust Honours Scholarship in Earth Sciences

Teagan Romyne | Bachelor of Science (Advanced) (Honours) (Geology) | The University of Adelaide

Nyrstar / Playford Trust Scholarships

Princess Mae Ladra (Fourth Year) | Bachelor of Engineering (Honours) (Mechanical) | University of South Australia

Rebecca Tan (Fourth Year) | Bachelor of Engineering (Honours) (Chemical) with Bachelor of Finance | The University of Adelaide

Thomas Jackson (Third Year) | Bachelor of Engineering (Honours) (Mechanical) | University of South Australia

Barbara Karageorgos (Third Year) | Bachelor of Engineering (Honours) (Chemical, Minerals Processing) | The University of Adelaide

OZ Minerals / Playford Trust Minerals Industry Honours Scholarship

Braden Morgan | Bachelor of Science (Honours) (Mineral Geoscience) | The University of Adelaide

SA Power Networks / Playford Trust Scholarship

Liam Mallamo | Bachelor of Engineering (Honours) (Electrical and Electronic) | University of South Australia

Seeley International / Playford Trust Scholarship – To be determined

Playford Trust Honours Scholarships - Flinders University

Matthew Evans | Bachelor of Engineering (Honours) (Software) / Bachelor of IT (Digital Media)

Jai Meyers | Bachelor of Science (Honours) (Biotechnology) (Enhanced Program for High Achievers)

Susanne Sahlos | Bachelor of Science (Honours) (Nanotechnology)

Laura Schroder | Bachelor of Science (Honours) (Enhanced Program for High Achievers)

Samuel Tonkin | Bachelor of Science (Honours) (Enhanced Program for High Achievers)

Playford Trust Honours Scholarships - The University of Adelaide

Keshika Alagiyage | Bachelor of Engineering (Honours) (Chemical and Pharmaceutical)

Thomas de Heus | Bachelor of Engineering (Honours) (Mechanical and Sustainable Energy)

Maximilian Donaldson | Bachelor of Engineering (Honours) (Chemical) with Bachelor of Science (Chemistry)

Jenna Draper | Bachelor of Science (Honours)

James Feeney | Bachelor of Engineering (Honours) (Electrical and Electronic) with Bachelor of Finance

Tristram Fyfe | Bachelor of Engineering (Honours) (Chemical) with Bachelor of Finance

Playford Trust Honours Scholarships - University of South Australia

Jacob Dalgleish | Bachelor of Science (Honours)

Cintya Dharmayanti | Bachelor of Biomedical Research (Honours) / Bachelor of Pharmaceutical Science

Andrew Du | Bachelor of Engineering (Honours) (Electrical and Electronic)

Anthony Randell | Bachelor of Sustainable Environments (Honours)

WSP / Playford Trust Scholarship

Douglas Radford | Bachelor of Engineering (Honours) (Civil and Environmental) with Bachelor of Finance | The University of Adelaide

Coopers Brewery / Playford Trust PhD Scholarship

Lucien Alperstein | School of Agriculture, Food and Wine | The University of Adelaide

Playford Trust PhD Scholarships

Yazan Arouri | Australian School of Petroleum | The University of Adelaide

Andrea Bertram | Fisheries Genomics | Flinders University

Nicholas Booth | Biotechnology | Flinders University

Thomas Foods International / Playford Trust PhD Scholarship

Niki McCarthy | Animal and Veterinary Sciences | The University of Adelaide

2018 TAFE SA Award winners

The Playford Trust was pleased to honour eight worthy students at the Playford Trust / TAFE SA Awards at Urrbrae Campus in November 2018.

Karren Raper, TAFE SA said: "These annual Awards provide a fantastic opportunity for both TAFE SA and its students. They ease the financial pressure on students, and open doors for their careers. The Awards provide potential employers with insight into these students' achievements, as well as develop networks with other Award recipients across disciplines.

"For TAFE SA, the relationship with the Playford Trust adds prestige to our programs and is highly valued by our students, enhancing their study and career aspirations. It helps strengthen partnerships with universities, particularly with the Waite Campus and Arboretum."

Open Gardens SA / Playford Trust /TAFE SA Award Elleca Polson

Diploma of Horticulture, Urrbrae Campus

Elleca was inspired to pursue a career in horticulture after working for Greening Australia on a mine rehabilitation project in 2015. In 2016, she was involved in a revegetation study involving several week-long trips to remote regions of SA and Victoria.

Elleca works full-time in garden care at Bunnings, is an aspiring apiarist, and her goal is to work with a team of passionate horticulturalists and landscapers designing ecologically friendly and environmentally sustainable gardens around Adelaide.

Open Gardens SA / Playford Trust /TAFE SA Award

Cassandra Rogers

Diploma of Arboriculture, Urrbrae Campus

Cassie took on the Diploma of Arboriculture to improve her skills and knowledge as an administrator at Arborman Tree Solutions. She already has a Bachelor of Biotechnology and Bachelor of Teaching in Secondary Education (Science) and is a Quantitative Tree Risk Assessment Registered User.

Cassie is hooked on the idea of becoming an urban planner so she can actively promote the retention of trees in future developments.



L to R Dean Brown (Board Chairman), Cassandra Rogers, Daniel Carney, Jason Cullen, Elleca Polson, Cathryn Apps, Francene Connor, Joe Kupke, Lyn Edwards (Open Gardens SA), Yuri Rancen, Leanna Read, Don Bursill, Alex Reid (Acting CEO, TAFE SA), Jacqui McGill and Dean Standish.

Open Gardens SA / Playford Trust / TAFE SA Award

Lu-Wei Spinks

Certificate III in Conservation Land Management, Certificate III in Horticulture, Mount Gambier Campus

Lu-Wei embarked on her TAFE studies to develop practical, on-ground fieldwork skills and experience to address environmental conservation and land management issues.

She is doing an internship and hopes to inspire an interest in native plants and gardens through community environmental education.

Playford Trust / TAFE SA Award Cathryn Apps

Diploma of Landscape Design, Urrbrae Campus

Cathryn has been gardening since 2003. Her greatest motivation is to transition from gardener to landscape designer.

A graduate member of the Australian Institute of Landscape Designers and Managers, and a student member of Master Landscapers of SA, Cathryn aims to enter a show garden in London's famous Chelsea Flower Show.

Playford Trust / TAFE SA Award Daniel Carney

Diploma of Conservation Land Management, Urrbrae Campus

Daniel has worked as an assistant arborist and with the Department of Education in a variety of roles, and volunteers with Trees For Life and Bush For Life.

He plans to undertake further study in holistic management practices – particularly permaculture. His longer-term goal is to work in the industrial hemp industry in SA.

Playford Trust / TAFE SA Award

Jason Cullen

Certificate III in Conservation Land Management, Urrbrae Campus

Jason became a volunteer with Trees For Life and the Friends of Sturt Gorge early in 2018, after noticing a 'Bush For Life site' sign in the Blackwood Hill Reserve behind his house. Twenty Bush Action Team events later, he was inspired to study conservation and land management.

Jason's commitment is reflected in his extensive conservation volunteer work, including in Guatemala, where he initiated a public waste disposal project to protect a local water source.

Playford Trust / TAFE SA Award

Joe Kupke

Certificate III in Arboriculture, Urrbrae Campus

Joe started a tree pruning and removal business in 2017. Prior to that he had worked as a sub-contractor, cutting trees for power line clearance, and disliked how trees were treated. He wanted to develop his skills and learn more about maintaining the health of trees.

As well as educating himself, Joe is sponsoring the retraining of his employee into the arboriculture industry.

Playford Trust / TAFE SA Award

Wanphen (Yuri) Rancen

Certificate II in Horticulture, Urrbrae Campus

In 2017, Yuri received an Australian Government Volunteer Award and this encouraged her to link her interests in community and gardening. She volunteers at her local kindergarten, where she shares her passion of gardening, culture and family values with children.

She plans to complete a Certificate III in Horticulture, volunteer, seek work in a nursery and start her own market garden.

2018 Regional Science & Engineering Scholarships



Renae Kretschmer

Bachelor of Science (Animal Science)
The University of Adelaide

Growing up on my family's organic farm in the Wirrabara Forest, I developed a strong interest in agriculture – specifically sustainable, regenerative and ethical animal production.

I had a good education at Booleroo Centre District School, became interested in science subjects early on, and that led me to study Animal Science at The University of Adelaide.

My move to Adelaide in 2018 was a challenge because of my big involvement on the farm. However, the Playford Trust Scholarship, which was an honour to receive, gave me confidence that the move was the right decision, as finances had been a big concern. St Ann's College and its welcoming community of people experiencing similar changes helped me adapt to a new lifestyle right from Day One.



Alison Roennfeldt

Bachelor of Science (Advanced)
The University of Adelaide

I grew up in the Barossa Valley and completed my secondary schooling at Faith Lutheran College.

For my first year of university I commuted from the Barossa to Adelaide. The costs associated with travel, including buying my own car, were alleviated and made less stressful by the Playford Trust Scholarship I received. Although the extra travel and navigating the train system were initially difficult, I quickly learned to use my time on the train to study, and also found it a great way to keep in touch with high school friends who caught the same service.

I greatly enjoyed my first year of university and absolutely loved finding many like-minded friends. I really enjoyed all of the biology subjects I took, along with chemistry, and liked the strong practical focus of each. At the end of my degree, I am hoping to major in genetics and biochemistry and pursue a career involving research.



Samantha Edwards

Bachelor of Health and Medical Sciences (Advanced), The University of Adelaide

I am from a farm near Avenue Range, in the South East of South Australia, but I completed secondary school at boarding school in Adelaide.

My Playford Trust Scholarship eased the financial strain of shifting to new accommodation, allowing me to focus on my studies.

Most of the subjects I studied were health and biology-related, and I particularly enjoyed the Essentials of Neuroscience course, as the complexity of the nervous system is endlessly interesting.

In September, I was a cast member in the university's French play, and this was one of the highlights of my year. I also tutored two Year 12 students and appreciated the opportunity to use and share my knowledge. Next year, I am looking forward to a more permanent role tutoring boarding students at Immanuel College.

I plan to pursue a career in medical research, as I wish to contribute to the development of technologies and treatments that will improve the health of our community. South Australia is a leader in health and medical research, so Adelaide is an ideal place to achieve these goals.



Eliza Watt

Bachelor of Robotics (Honours)/
Masters of Electronics, Flinders University

I finished my schooling in 2017 at St Mark's College and left my family and my home town of Port Pirie to begin studying at Flinders University.

My Playford Trust Scholarship not only eased the financial strain of moving to the city but has encouraged me to always make the most of any opportunity thrown my way. Over the past year, my love of maths and science has grown, and I've discovered a new love of coding and creating real life solutions to real life problems.

I've enjoyed meeting a huge range of amazing people, my confidence in my abilities has improved and I feel extremely proud of where I am today. Highlights of my year include participating in a Women in Engineering workshop for rural schools and being selected to represent Flinders at the Australian Institute of Nuclear Science and Engineering (AINSE), in Sydney, as a member of the Women in STEM and Entrepreneurship School. The latter enabled me to connect with industry professionals and develop the soft skills that are essential in industry. I also gained employment at Global Pumps as a Project Assistant in the Major Projects department, where I work side by side with experts and engineers.

2018 Playford Trust Honours Scholars Research Reports



Samuel Arthurson

Bachelor of Civil and Structural Engineering (Honours) with Bachelor of Mathematical and Computer Sciences, The University of Adelaide

Brickaids – Bandaids for bricks

My research focused on using carbon fibre reinforced polymers (CFRP) to retrofit unreinforced masonry buildings. This is something that has been used in practise before, however the innovation of my project involved the implementation of mechanical anchors also made from CFRP material.

It is crucial to retrofit unreinforced masonry buildings as they are highly susceptible to failure under earthquake loads. To do this, we performed some experimental modelling on single brick specimens and found that both strength and ductility of the unreinforced masonry was increased. We were able to use this knowledge and create and validate a model that can output the displacement of a complete unreinforced masonry wall. This displacement was dependent upon the force applied on the wall itself.

I found this research to be particularly rewarding as I believe there is a great value for society in using CFRP in practise – it may actually save someone's life in the event of an earthquake!

At the university's Ingenuity event, where all Honours projects are showcased to the public, my group was awarded the Structural Engineering Group Presentation Prize. In 2019, I will begin my final year of tertiary education and have been accepted to study at Lund, Sweden, on exchange for Semester One.

Nicholas Booth

Bachelor of Science (Biotechnology), Flinders University

Characterising abiotic stress responsive genes in chickpea for use in molecular plant breeding

Chickpeas are an economically important food crop, but production of this legume is limited by its sensitivity to abiotic stresses, including drought, salinity and extreme temperatures. Through molecular plant breeding it is possible to select for chickpea cultivars that have an increased tolerance to these stresses.

During my Honours research I identified a suite of genes that were responsive to abiotic stress and accumulated to greater levels in stress-tolerant chickpea cultivars when compared with stress-sensitive cultivars. It is possible, with further research, that these genes will become suitable biomarkers for use in the national chickpea breeding program and improve the agricultural viability of chickpeas in Australia. Flinders University has provided me with the opportunity to continue my research, screen a larger number of chickpea varieties and validate these genes as molecular biomarkers of stress tolerance.

The Playford Trust Honours Scholarship, along with the support of my supervisors, enabled me to travel to the Legume Hub Annual Meeting, and to the ComBio 2018 conference, where I was able to present my research to the greater scientific community. These opportunities to network extended my passion for scientific research and have encouraged me to continue my research through post-graduate opportunities.

Angus Butler

Bachelor of Science, The University of Adelaide

A genetic dissection of grain and reproductive traits in barley

Barley is the second most widely grown crop in Australia, with exports valued at \$2.42 billion in 2016-17. Improvements in traits that contribute to quality and yield deliver financial benefits to growers, as well as processors such as maltsters. Plant breeders aim to continually improve the genetic yield potential of barley, and sophisticated new techniques are being used to increase the grain industry's profitability.

My project is being conducted at Australian Grains Technology (AGT), Australia's largest plant breeding company, headquartered in Roseworthy, South Australia. A major aim of the project is to use a technique called association mapping to identify regions of the genome that are associated with traits of interest. These traits include yield, grain size and grain density.

Association mapping offers both a high level of accuracy and the ability to analyse the genetically diverse plant populations used in breeding programs. I have gathered physical and image-based data from the AGT barley population for each target trait. I will soon begin to use this information alongside genetic data provided by AGT to perform my analysis. I will also seek to validate previous research findings that suggest the significance of particular genetic regions. Following my project, AGT will be able to use any significant findings as a basis to select barley lines with improved trait performance.



Tanya Charlson

Bachelor of Sustainable Environments,
University of South Australia

Burning bush may save a threatened South Australian plant from extinction

Many Australian plants have dormant seeds that only respond to a hot summer bushfire. But how hot is too hot?

Fire intensity is the fundamental key to survival of my study species *Logania recurva*. *Logania* is a small shrub related to the strychnine tree and is endemic to South Australia in the Mount Lofty and Fleurieu Peninsula regions. However, it is struggling to survive without bushfires.

My research has proven that the absence of fire is contributing to the disappearance of viable populations. Through experimentation in controlled incubators at the Seed Conservation Centre of SA, we have identified that the barrier to germination and recovery is the lack of a low or medium-intensity fire. South Australian heathlands will need vegetation burn-offs that are carefully planned and timed throughout the seasons to ensure fire-stimulated species receive sufficient heat and smoke, while entire communities of plants are fully protected.

The organisation of burn-offs must focus not only on the reduction of fuels and competition but also on intense fire and smoke to break seed dormancy and promote germination. By simulating conditions of low, medium and intense fires that would naturally occur seasonally, we confirmed that *L. recurva* seed dormancy was broken when exposed to a low to medium-intensity fire, and germination was significantly stimulated in the laboratory.



Georgina Duguid

Bachelor of Engineering (Civil),
Flinders University

Halloysite Kaolin as microfiller in slag and fly ash-based geopolymer mortar

The aim of my research was to investigate environmentally sustainable and property enhancing filler materials for geopolymer concrete – an emerging material that could one day replace the unsustainable Ordinary Portland Cement (OPC)-based concrete mixes that we currently use in construction.

Samples of halloysite kaolin, a type of clay with natural and unique nano-tubular properties – and found abundantly in South Australia – was donated to me by Minotaur Exploration for my experimental analysis. The high halloysite clay showed marked improvement in both the compressive and tensile strength of the mortar mixes, as well as improving other physical and mechanical properties. In an environmental analysis that compared OPC concrete with halloysite-based geopolymer concrete, embodied CO₂ emissions/m³ could be reduced by 120-132 per cent.

During my final year, I am working part-time for Australian mineral processing and design company Mineral Technologies. Having support from my employers, Minotaur Exploration and the Playford Trust has given me the opportunity to pursue my interest in mineral processing and structural engineering design as a career. I hope to work towards learning more about the Australian and global mining industry, and ways in which we can improve engineering efficiency, reduce environmental impacts, and encourage economic growth and local employment.



Arthur Crichton

Bachelor of Science, Flinders University

One-million-year-old mammal fossils evidence changes in species composition and body size in response to changing Australian climate

This study offers the first stratified record of faunal change from the early-through-middle Pleistocene epoch in Australia. A key finding is a general shift towards increasingly arid-adapted fauna over this period, consistent with the growing body of evidence for increasing aridity in Australia over the past one million years. This arid shift was associated with declining small mammal diversity and species richness.

The study also provides the first successional evidence for cyclic change in faunal composition, as well as body size, during the early Pleistocene, likely in response to a glacial-interglacial cycle of 41,000 years, or interglacial duration between 41,000 and 100,000 years. Significant inverse body size trends were recorded for the three native rodent species investigated: a dietary generalist; and two arid flora specialists. These body size trends are consistent with food availability, as opposed to thermoregulation, as the principal mechanism influencing body size change in semi-arid to arid conditions.

Geochronometric dating will provide invaluable further insights to evaluate these inferences. I presented the results of my Honours project at the Earth Sciences Student Symposium, intend to publish my findings in the coming year and am planning to build on this study through undertaking a PhD.

2018 Playford Trust Honours Scholars Research Reports

Sarah Graham

Bachelor of Biomedical Research,
University of South Australia

Development of thermally responsive polymers for biomedical applications



Thermoresponsive polymers (polymers which can transition from solution to gel with response to temperature) have been a growing field of interest over recent years. The

potential applications of these polymers are wide reaching, and include drug delivery, cell therapies, tissue engineering and 3D bio-printing. This project focused on developing thermoresponsive polysaccharides for potential use in these applications.

Polysaccharides are generally considered biocompatible, and many are biodegradable in humans, thus they are ideal for biomedical applications. However, most are not naturally thermoresponsive and those which do exhibit thermoresponsivity are limited by the temperatures at which they gel.

In this project, we developed a synthetic approach in which we functionalised the backbone of non-thermoresponsive polysaccharides with small molecules, enabling them to undergo a thermo-reversible transition. It was found that by altering the degree of substitution, the temperature at which the transition takes place can be tuned. Additionally, initial in vivo toxicity studies suggested that the polymers are biocompatible with all major organs and tissue types within mice. Two polysaccharides were investigated – dextran and amylopectin. Functionalised amylopectins showed limited solubility in water, however functionalised dextrans displayed interesting thermoresponsive properties and trends that would make them useful in biomedical applications. From this work we published a review article and also intend to publish the results obtained through these studies.

Bradley Kirk

Bachelor of Science, Flinders University

Optimisation of polymer solar cell fabrication via slot-die printing

With advancements in third-generation solar cell technology, there is a push towards the large-scaling of these devices. This has led to interest in the research and development of large-scale printing methods compatible with roll-to-roll fabrication. These methods would allow continuous fabrication of devices with minimal waste of materials. The project investigated how the adjustment of the active layer ink affects the performance of the polymer-based solar cells with the use of die-slot printing.

Six months into the project, we have observed how different solvents and additives can affect the performance of the device. We have also used several analytical techniques, including the Atomic Force Microscope, Auger Nanoprobe microscope and the neutral impact ion scattering spectroscopy at Flinders University to get a better understanding of the physical structuring and elemental distribution throughout the active layer.

In December 2018, I took part in a poster presentation at the Australasian Community for Advanced Organic Semiconductors Symposium, discussing the results and potential this technology has for the solar cell industry. At the symposium, I was also able to gain a better understanding of the different types of research being conducted in Australia and New Zealand in relation to organic semi-conductors.

Benjamin Madigan

Bachelor of Science,
The University of Adelaide

Metal-organic framework materials for use in gas separation processes



Gas separations are of major importance, with one key example being their use to isolate the harmful gases produced in industrial processes.

Current gas separation technology is rather energy intensive, and hence expensive, so research into alternatives is of significant interest.

Metal-Organic Frameworks (MOFs) are a class of highly porous materials that have been shown to have potential for use in gas separations, and the research conducted during my Honours year was focused on the synthesis and investigation of new MOFs for this application.

Undertaking my research has proven to be a valuable and rewarding experience, and has allowed me to develop lab skills as well as skills associated with planning and maintaining an individual project. The research culminated in the successful synthesis of a new copper-based MOF material that displays a very interesting crystal structure. Future work will involve investigation of the gas adsorption properties of the new MOF to assess its suitability for use in gas separation processes.

Sarah McDonald

Bachelor of Science,
The University of Adelaide

How has the East Asian Monsoon changed over the last 8000 years?



The East Asian Monsoon controls the water resources for a region covering China, Korea and Japan. Around a third of the world's population relies on this rainfall for

fresh water and sustaining agriculture and is therefore at risk from climate disasters

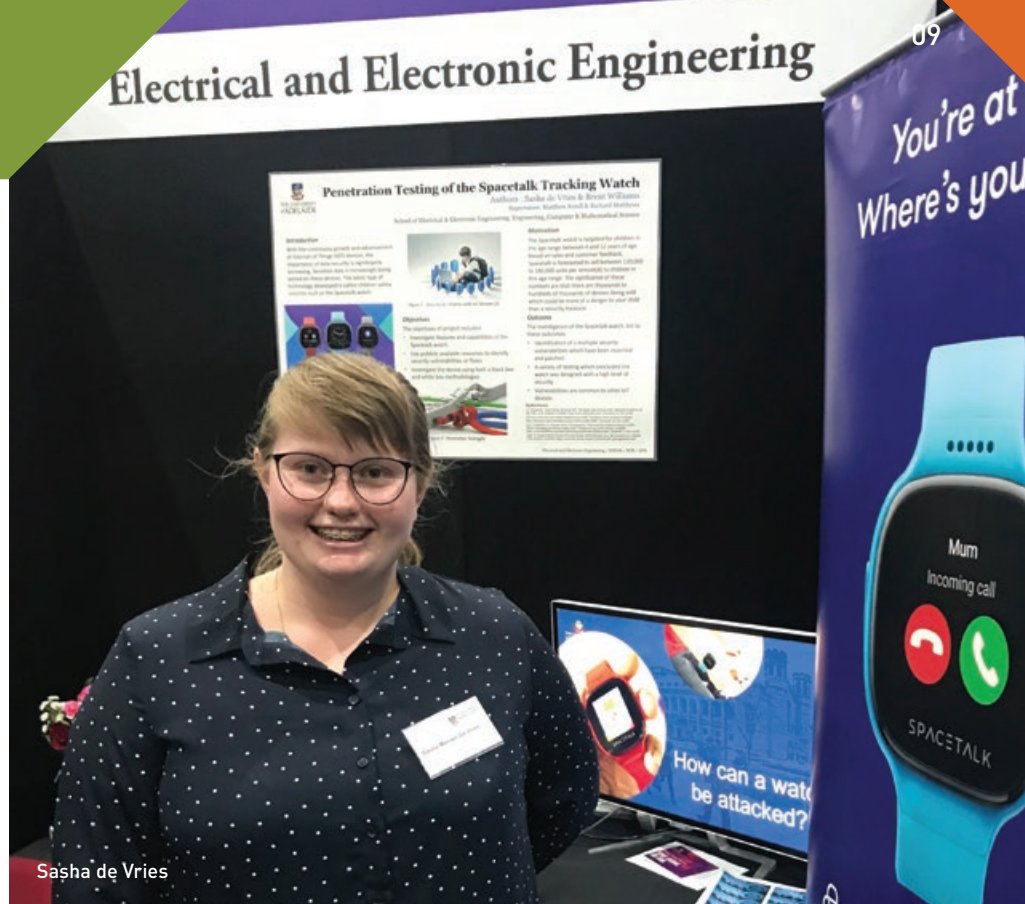
Bradley Kirk



such as drought and floods. Understanding how the monsoon may evolve is thus crucial for characterising future climate risk.

One of the ways we can try to understand future changes is to use natural archives to look at how the monsoon has varied in the past. My project used a combination of lake sediments from near Mt Fuji, in Japan, together with statistical analyses of published records to investigate how the monsoon has changed over the past 8000 years.

My analysis identified differences in the controls on monsoon rainfall between continental and coastal Asia. This research contributes to a growing body of knowledge on what causes changes in monsoon rainfall. This knowledge can be used to model future monsoon changes and then help with the future management of water resources across one of the world's most populous regions.

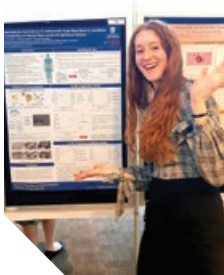


Sasha de Vries

Kara Paxton

Bachelor of Biomedical Research,
University of South Australia

Using different ingredients to improve the absorption of antipsychotic drugs currently on the market



The major result of my project was that the antipsychotic drug, Risperidone, had reduced performance in all formulations, while an alternative, Lurasidone, showed improved

performance across all formulations. This demonstrated the dependence of formulation performance on drug physicochemical properties.

The key benefit of increasing the absorption of existing antipsychotics is the potential to reduce dose – and, in turn, dose-related adverse effects – toxicity and compliance with medication. During my Honours study, I was able to go to Singapore and present my research in a poster.

I am currently working at The Australian Wine Research Institute as a laboratory technician to analyse taints in wine. The aspect of Honours that I found most challenging was the fact that the project was solely my responsibility, and I therefore needed very good time management to complete all experiments.

Andrew Vorrasi

Bachelor of Engineering (Honours)
(Mechatronic), University of South Australia

Agile flight control of a multi-rotor airframe



Unmanned aerial vehicles (UAVs) are becoming increasingly popular in both commercial and civilian applications, particularly multi-rotor airframes such as quadrotors.

This is due to their simple structure, ease of use and flight capabilities. At the core of any UAV lies the flight controller, a software component that controls the UAV's motion.

My project developed a flight controller more adept for agile, military focused flight, using a design, test and build approach, and undertaking a combination of MATLAB software simulation and hardware testing. It achieved improved performance compared with the commercial baseline offering and set the foundation for future University of South Australia students to build on the UAV system. Most importantly, the project required me to adapt to changing requirements (not uncommon in commercial industry) as a result of altering hardware platforms.

I enjoyed my final year of engineering, particularly a variety of hands-on courses,

including leading a team in the development of an autonomous ground vehicle with maze navigation, obstacle avoidance and target detection capabilities. I look forward to the next chapter, starting my career in South Australia's growing defence sector with Lockheed Martin.

Sasha de Vries

Bachelor of Electrical and Electronic Engineering, The University of Adelaide

Enhancing cybersecurity for children's mobile devices

My project was referred to as the 'penetration testing' of the Spacetalk safety watch. The aim was to investigate the security of this specific GPS tracking smartwatch marketed for child safety. We investigated connectivity such as WiFi and 4G connection, user interface on the device, interconnection between the smartwatch and the parent application, and hardware connections such as USB.

The project was able to determine vulnerabilities and flaws, within both the device and application, that necessitated improvements being undertaken by the developing company. The identification of these flaws provided an opportunity for the device's security to be enhanced so it was much more secure.

As part of my Honours project, I completed a cybersecurity summer school in Estonia. While there, I was involved in presenting my work at the international Interdisciplinary Cybersecurity Research Conference.

2018 Playford Trust Partner Scholarships Research Reports



Ellen Fryar

AusIMM / Playford Trust Honours Scholarship

Ellen Fryar

Bachelor of Engineering (Honours) (Mining),
The University of Adelaide

Investigating the potential use of microwaves for rock fragmentation – and potentially saving big bucks!

My Honours project investigated whether we could reduce rock strength by thermally inducing micro-fractures in test samples. The potential benefits for the mining industry, if successful, would be to reduce the energy required to crush and grind during ore processing, saving huge amounts of money.

We applied a range of microwave exposure times to the sandstone and granite samples and tested them using a range of lab apparatus, including sonic velocity testing, uniaxial compressive strength testing, acoustic analysis and CT scanning. Although our results were not positive, literature suggests that micro-fractures should have formed, and the energy required to cause rock failure reduced. We therefore proposed alternative testing parameters that may achieve better results should the project be undertaken again by another group.

In July, I organised an international trip for a group of five students and one supervisor to the United States to see different mines in operation and visit the prestigious Colorado School of Mines, which was eye-opening for us as mining students. After receiving quite a few offers, I have decided to take a position with Rio Tinto at a bauxite mine in the NT. My goal is to obtain my mine manager's certificate within 10 years and work at an international operation at least once.

Chartwells / St Ann's College / Playford Trust Residential Scholarship

Thomas de la Perrelle

Bachelor of Engineering (Honours)
(Mechanical)/Bachelor of Science,
The University of Adelaide



My family currently live in Port Lincoln, where I completed my secondary schooling. On moving to Adelaide, I found travelling in the city challenging to get to extracurricular activities.

My scholarship enabled me to transition without the need to work during term time. I was able to stay involved in extracurricular activities and build my support networks without negatively affecting my study. This gave me time to enjoy my studies, especially dynamics, programming and mathematics. In mathematics, I gained new tools to apply to refreshingly unfamiliar problems in dynamics and programming.

I have enjoyed forming a close group of friends with other student engineers, having a wide range of facilities available, and having the freedom to learn topics and styles that the university offers. On finishing my degree, I aim to work in the space industry, possibly at the orbital launch facility at Whaler's Way on Eyre Peninsula.

Geological Society of Australia / Playford Trust Honours Scholarship

Dillon Brown

Bachelor of Science (Honours) (Geology),
The University of Adelaide

What can the oldest high-pressure rocks in the geological record tell us about the dynamics of ancient subduction regimes?



Eclogites are metamorphic rocks that form at high pressures and low temperatures during the process of subduction – where the Earth's oceanic crust is consumed and delivered into the

mantle. My Honours research encompassed an investigation of these rocks, to answer questions as to the nature of ancient (two-billion-year-old) subduction regimes. Questions like: how are such rocks transported from great depths all the way to the Earth's surface?

This research has demonstrated that ancient eclogites, after their formation at depth within subduction zones, may have made their way back to the Earth's surface relatively rapidly in terms of geological timescales – that is, about five million years. This may not have been all that dissimilar to those operating today in the modern Earth.

These findings are especially significant because they say something about the nature of large-scale tectonic processes operating in the ancient Earth – a research area that is not without debate. Perhaps of more value, this research reflects an undeniably worthwhile exercise in scientific curiosity.

Hillgrove Resources / Playford Trust Scholarship

Maddison Booth

Bachelor of Science (Honours),
The University of Adelaide



South Australia's Kanmantoo copper/gold deposit has had a history of exploration and production since the 1800s. Despite this, there are still significant gaps in our knowledge of this deposit and its surrounds.

My project, in collaboration with Hillgrove Resources, aimed to constrain the distribution and mineral relationships of gold within the deposit. During my studies I gained exposure to a variety of recently developed technologies and techniques. I had the opportunity to undertake vacation work and research at the Kanmantoo mine, gaining valuable practical industry experience.

My scholarship enabled me to attend and present at several industry events, including the South Australian Exploration and Mining Conference and the Australian Geoscience Council Convention. I was able to network with industry while communicating and promoting my research findings. I have enjoyed every aspect of my time at university and look forward to my future within the mining and resources industry.

2018 AUSIMM/Playford Trust Scholarship & 2019 Nyrstar/Playford Trust Scholarship

Rebecca Tan

Bachelor of Engineering (Honours) (Chemical) with Bachelor of Finance, The University of Adelaide



In 2018, I completed my Honours project with CSIRO Minerals. Through an electrochemical study, I aimed to improve understanding of the dissolution mechanism and interfacial

properties of chalcopryrite heap leaching. I have become immersed in the industry through my minerals-related Honours project, my experience in the industry, and my involvement with the AusIMM Adelaide Student Chapter.

I have had work experience with ExxonMobil and with natural gas pipeline operator SEA Gas. In 2019, I will be Vice President of the AusIMM Adelaide Student Chapter. These experiences have inspired me to build a career where I can work on site and be exposed to South Australia's most important industrial facilities.

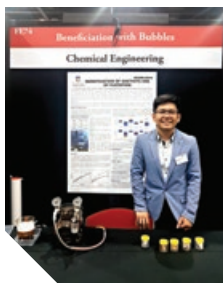
I volunteered with Project Everest in Cambodia and represented the School of Chemical Engineering at the International Engineering Summer School in China. I received a New Colombo Plan Scholarship and had the opportunity to network with like-minded peers from all over the world.

OZ Minerals/Playford Trust Minerals Industry Honours Scholarship

James Babas

Bachelor of Engineering (Honours) (Chemical) and Bachelor of Science, The University of Adelaide

Beneficiation with bubbles: Increasing the grade of iron ore



Australia has abundant deposits of goethite iron, but it is seldom mined because it is of lower grade compared with other iron ores, such as hematite or magnetite.

There has not been much research into processing goethite, however, as high-grade deposits run out, it is becoming more important to investigate how we can beneficiate – or treat – low-grade iron ores to improve their properties and economic benefit.

Flotation is an attractive choice for increasing grade, as it doesn't require high temperature or pressure, so it is cheaper than processes such as roasting. I used three different industrially available collectors and evaluated which of them could separate goethite from silica and alumina most effectively. The collectors provided little beneficiation. However, upon looking at their molecular structures, it became evident that collectors with long carbon chains are more effective than those with cyclic carbons. Modifying other flotation conditions can create a more effective flotation environment.

I was fortunate to have OZ Minerals support me with this project, and it was definitely a big help not only to receive the scholarship, but also to have an industry mentor who I could speak to about my project.

Thomas Foods International/Playford Trust PhD Scholarship

Nikki Dumbrell

Centre for Global Food and Resources The University of Adelaide

The social licence to operate in the Australian agricultural industry is an economics problem



'Social licence to operate' refers to the ongoing approval of an activity or industry by stakeholders or members of society affected by that activity/industry. Failure to meet social

expectations can affect the profitability of contested activities/industries and lead to policy change. However, the economics of social licence issues are not well understood.

My project seeks to: detail the economic foundations of the social licence to operate; describe multiple understandings and drivers of social licence issues as seen by different groups (policy-makers, resource users, public); and use case studies to

understand how mis-matched expectations influence policy decisions, profits and consumer/resource-users' behaviours.

The improved understanding could lead to a number of positive outcomes. More than 50 percent of Australia's land area is managed as agricultural land, so improved natural resource use and agriculture-community relations could have widespread benefits, including a solid basis to reform natural resources management decision-making.

WSP/Playford Trust Scholarship

Hoang-Cuc Nguyen

Bachelor of Engineering (Honours) (Civil and Structural), The University of Adelaide

Brickbats – Bandbats for bricks 2



Unreinforced masonry buildings are particularly vulnerable under earthquake loads. Due to their heritage value and the cost of rebuilding, many of

these structures still exist but need strengthening and rehabilitation. Seismic retrofitting using fibre-reinforced polymer (FRP) plates is popular because it is lightweight, easy to install and durable. However, the use of FRP anchors is limited by the lack of understanding of their combined reinforcement behaviour and a lack of specific design guidelines.

My Honours project sought to model the behaviour of masonry strengthened with FRP plates and anchors. Our numerical model prediction was found to be comparable with experimental results. A simplified approach was also developed to analyse retrofitted masonry walls and this could lead to the future development of a design method. We presented our research at Ingenuity 2018 – The University of Adelaide's showcase of engineering Honours projects – and our team won the Best Structural Engineering Award.

In July and September, I undertook work experience with the Transport & Infrastructure group at WSP. I was exposed to a wide variety of projects and work, went on site visits, visited one of their project offices, and even had the opportunity to attend the 2018 Australasian Structural Engineering Conference.

2018 PhD Scholars Research Reports

Playford Trust PhD Scholarship

Belinda Boehm

School of Physical Sciences
The University of Adelaide

Theory of self-assembly and charge transport in semiconducting polymers



Carbon-based organic semiconductors are a promising, and much cheaper, alternative to conventional inorganic semiconductors like silicon. They

also have some interesting applications – think about folding phones, flexible solar panels, and curved TV screens. However, they are not commonly used, largely due to their performance, which is not as good as the currently available technologies.

In my work, I look at organic semiconducting polymers, which can be thought of as molecular spaghetti. They are long chains of molecules and can be either all tangled up, or stuck alongside each other. If spaghetti is cooked in water, you would expect it to be tangled when you drain it, but organic polymers, depending on what liquid you 'cook' them in, will either be tangled, or stacked together in neat rows, or a bit of both.

The amount of stacking affects how well the device performs, and my work is focused on trying to predict this. I have used computer simulations for these predictions and obtained some interesting results that will be combined with larger models of the polymers to determine how stacking affects the interactions between chains. Hopefully, this will lead to some rules for designing polymers that are efficient enough to use commercially.

Thyne Reid Foundation / Playford Trust PhD Scholarships

Kaili Stacey

College of Science and Engineering
Centre for Nanoscale Science and Technology,
Flinders University

Production of novel photonic materials from silica particles.



Currently, paints and other coloured coatings are made using a mixture of pigments, polymers and solvents. Once the paint is coated on the walls, the solvent evaporates, leaving behind a coloured film. However, these

solvents can be unhealthy for humans and are the cause of the 'paint smell' when drying. These polymers often come from materials produced by the petrochemical industry, which is not considered 'green', or environmentally-friendly.

Silica (a.k.a. sand) nanoparticles have been used in nature to create stunning optical effects – most famously, opals are made from these particles. Since discovering this, scientists have been replicating this 'opal effect' with great success – and with the use of green solvents. However, there has been very little exploration into what other effects could be produced by silica particles arranged in different ways.

I recently had the opportunity to visit Cambridge University for a short-term study trip. My main purpose was to gain an understanding of how materials can interact with light, and to learn how to simulate these behaviours. This simulation is a key step in discovering which materials will actually produce interesting colours and, as a result, how I need to arrange the silica particles in order to create these effects.



Alex Van Leeuwen

Alex Van Leeuwen

School of Natural and Built Environments
University of South Australia

How to heat the crust – radiogenic heat as a driving force for metamorphism

Conventionally, geologists associate regions of high heat flow with tectonically and volcanically active regions of Earth's crust, eg. the Pacific 'Ring of Fire'. My project seeks to understand a very different mechanism of heating crust – via the natural decay of radioactive elements. If present in high enough concentrations, these elements can produce a significant amount of heat.

In the northern Flinders Ranges, Arkaroola hosts some of the hottest rocks on Earth in terms of radiogenic heat production. One of the aims of my project is to investigate what role the heat played in metamorphosing the younger sedimentary rocks which overlie them. Thermodynamic modelling used in tandem with microanalytical procedures enables us to quantify the age, pressure and temperature conditions of metamorphism recorded by these rocks. This allows us to determine whether radiogenic heating is a plausible mechanism to metamorphose rocks in the crust.

Developing an understanding of how radiogenic heat can thermally perturb the crust is key to developing more comprehensive models of how our planet works. The interplay between radiogenic heat and crustal metamorphism may be key in unravelling the complex and multifaceted geological framework of ancient continents like Australia.

Playford Trust PhD Scholarship



James Dorey

College of Science
and Engineering
Flinders University

Road tripping to uncover Australia's unknown and new native bees

Among the most exciting and often important aspects of research is the field work, and this is certainly the case for me. I am currently working my way up the entirety of Australia's eastern states, trying to discover new species of Australian native bees and collect existing species. My aim is to determine their genetic relationships and uncover reasons why we have an estimated 2000 to 3000 native bee species in Australia alone – and not just one.

Already, I have identified potentially undescribed and undiscovered species,

genera that I have never seen before, and probably enough data for several more PhD projects!

This kind of research will not only contribute to our understanding of bee and ectotherm evolution, but it will also inform us about which processes are threatening our native pollinator diversity and how we can conserve them. Of course, I believe that this work is important as it's very likely that many bee species have been, and will be, lost before they are even found.

Partners and Scholars working together

Codan / Playford Trust Scholarship in Engineering

Alexander Makarowsky

Bachelor of Engineering (Honours)
(Telecommunications),
The University of Adelaide

Drone control with animal brain structures



My team and I simulated the structure and information-processing behaviour of animal neurons in order to tackle difficult problems in robotics and control.

Our supervisor from the CSIRO is motivated by smarter flight control because it may allow drones to operate more safely and robustly. This may create wider applications for drones in confined or dangerous environments, such as in underground mines.

One of the turning points in our research was formally analysing the effect of finite-precision, computer-based neuron simulation instead of idealised, infinite-precision neurons and synapse models. The 'timing' of the neuron-to-neuron spikes represented very accurately in computers to achieve good performance. This noise-like effect had never been formalised in some

20 years of study into biologically-inspired 'spiking' robotics systems. We were able to use our results to accurately control the position of a swinging propeller arm, and this constituted a major step forward.

I have been awarded a John Monash Scholarship to further my studies and have applied to undertake a Master of Philosophy in Energy Technologies at Cambridge University. I hope to examine the reliability of energy systems in the context of intermittent energy sources and energy storage. Codan has been extremely supportive of my research and I recently undertook an internship with them, which gave me an opportunity to broaden my knowledge.

Coopers Brewery / Playford Trust Honours Scholarship

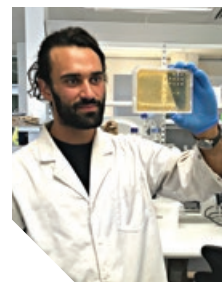
Lucien Alperstein

Bachelor of Science (Honours),
The University of Adelaide

Yeasts from traditional Indigenous alcoholic drinks

My Honours project has involved working with more than 1000 yeasts and bacteria isolated from Way-a-linah, a Eucalyptus sap, which was fermented by Tasmanian Aboriginal people using the aptly-named Cider Gum.

There are many different types of wild yeasts found across the world, each with their



own uses and characteristics. My project has involved conducting very small fermentations and tests to assess in what conditions these Tasmanian wild yeasts can survive and thrive,

what characteristics they might bring to the traditional fermented beverage, and how well they survive in alcoholic fermentation. Some of these yeasts may be unique to Australia, and we are hoping to better understand how they work.

I was lucky enough to go on a field trip to collect samples from rare Cider Gums at a plantation, and attend a conference in Sydney. I look forward to discussing my ongoing fermentation research with Coopers and appreciate very much their support.

John Meneses, the Supply Chain Manager at Coopers applauded the high calibre of the students who have received Coopers Brewery/Playford Trust Scholarships.

'Their research has provided good insights into ways to improve the great range of products coming out of Coopers', he said. 'Coopers encourages other South Australian companies who are looking to support high achieving students to consider supporting the Playford Trust's scholarship program.'

Nyrstar / Playford Trust Scholarships

Nyrstar is excited to join as a Partner with the Playford Trust in 2019 and the feeling is mutual.

This year the Nyrstar/Playford Trust scholarships have been awarded to four outstanding chemical and mechanical engineering students. They are Barbara Karageorgos, Thomas Jackson, Princess Mae Ladra and Rebecca Tan.

These scholarships involve an eight-week placement at the Nyrstar Port Pirie smelter. Barbara, Thomas and Princess undertook their placement in January and February and Rebecca's will commence soon

Both Thomas and Princess joined the site reliability engineering team, working on improving site infrastructure documentation; inspections of civil structures; seal design for screw conveyors; heat exchanger designs; reviewing risk assessments around flammable gases; and greater efficiencies



Thomas Jackson

in the maintenance systems. All tasks were carried out to a high standard and their commitment and work ethic was excellent.

Barbara undertook a study to determine the best methodology for reducing the concentration of chlorides in residue from the copper plant. She came up with some innovative and 'out of the box' thinking to deliver low-cost, fit-for-purpose options. These are now being piloted to determine the best option to implement later this year. Again, the project Barbara worked on was delivered to a high standard with a high level of commitment to safety and work ethic.



Princess Mae Ladra

Bill Watt, Nyrstar's Manager - Technology and Continuous Improvement is very happy with his involvement with the Playford Trust. He advised that: "the impact from the work placements gives real financial benefits to Nyrstar, including greater reliability and longevity of equipment; significantly lowered costs; and options that deliver better outcomes for treating more high value residues in their plant." He said that: "Nyrstar staff are also highly impressed with the scholars, not just their level of expertise, but how they interacted with personnel and contractors."

Continuing PhD Scholars Research Reports

2016 Flinders University / Playford Trust PhD Scholarship

Olivia Davies

(pictured front cover)

Lab of Evolutionary Genetics and Sociality,
College of Science and Engineering

Can parasites be beneficial? The role of the bacterial parasite *Wolbachia* in native Australia bees

Parasites are hyper-diverse and can have a long list of disastrous effects on their hosts. But can these devastating parasites transform into an ally with mutual benefits for themselves and their hosts? My project explores the role of a widespread insect parasite, *Wolbachia*, in a group of very successful Australian native bees – the Hylaeinae, or masked bees. A common species of native hylaeine bee, *Amphylaeus morosus*, is very unusual, as it is afflicted with the condition 'mitochondrial heteroplasmy', where every individual has two different types of mitochondria.

I am investigating whether the parasite *Wolbachia* has formed a dependant relationship with its hosts' strange mitochondria. This bacterium can have a multitude of effects on insect hosts, however the mechanisms that dictate these effects are not well known. I am examining

these mechanisms in *A. morosus* and other related bee species to look for patterns of infection and susceptibility.

The transition from parasite to mutualist was a key step in the evolution of complex life on Earth, hence the question: Is *Wolbachia* starting to make this transition millions of years later?

2016 The University of Adelaide / Playford Trust PhD Scholarship

Troy Rogers

School of Biological Sciences
The University of Adelaide

Using fish ears to uncover the life history of an iconic South Australian species

My PhD investigates the early life history of King George whiting in South Australia, using the biological information stored in fish ear stones (otoliths). Specifically, I have determined that multiple spawning sources contribute to the SA population, and that fish in different regions of the state were spawned in different areas.

I am currently working with oceanographers to connect the dots between spawning and nursery areas, which will help to close the life history loop. The improved understanding of King George whiting life



Troy Rogers

history will influence the development of management strategies to ensure the longevity of this iconic local species.

One manuscript from my PhD has recently been published in *Marine and Freshwater Research*, and another has been submitted to *Estuarine, Coastal and Shelf Science*. Last year, I presented some of my work at the 6th International Otolith Symposium, in Taiwan, and the Australian Society for Fish Biology Conference, in Melbourne. Support from the Playford Trust is fundamental to successful outcomes in my project.

New Partner list grows

In 2018, three new Partners joined forces with the Playford Trust to offer even more scholarships and work opportunities to South Australian students. They are:



Aurecon is an engineering and infrastructure advisory company which serves clients across a range of markets, in locations worldwide. Aurecon's DNA is hardwired to leave a legacy using engineering, design and the deep need.



Nyrstar is a market leading, global metals business producing zinc, lead and other base and precious metals. Nyrstar Port Pirie is the largest single stream primary lead smelter in the world and has recently undergone a A\$660m site upgrade to improve its environmental performance and increase its flexibility as a multi-metal production facility.



Open Gardens SA was established as a stand-alone organisation in 2015 after the national scheme closed after 25 years of showcasing local gardens to the public. Each year, tens of thousands of visitors are welcomed to more than 130 private gardens across SA, with funds raised going back to garden owners and their chosen charities.

Reports from Past Scholars

2014 AusIMM / Playford Trust Honours Scholarship

Michael Dello-Iacovo

The University of Adelaide

Adapting earthly geophysics to the exploration of space

I received the AusIMM/Playford Trust Scholarship for my Honours degree in geophysics in 2014 for the thesis topic 'heat flow and geothermal energy in South Australia'.

After completing that degree, I stayed in the geophysics industry and worked for an Australian energy company for several years as a geophysicist.

In 2016, I began a PhD in space science at the University of New South Wales, where I am looking at the feasibility of using geophysical techniques to map the surface and interior of asteroids and other planetary bodies such as the Moon and Mars.

I spent 2017 interning in Los Angeles at the Jet Propulsion Laboratory – a partnership between NASA and the California Institute of Technology – where I was able to use their lab equipment to further my research. For example, I used a vacuum chamber to recreate the atmospheric environment on Mars and examine the effect of atmospheric pressure on seismic data collection. It was completely novel research.

I am now finalising my lab work and computer modelling in preparation for finishing several papers – and my thesis. Outside of my day job, I have been interested in environmental and animal welfare issues for a long time.

I have received several prizes for essays about climate change in Australia and the future ethical concerns around space exploration.



Michael Dello-Iacovo



Daniel Austin

2007 TAFE SA / Playford Trust Award

Daniel Austin

From scholar to lecturer via Africa, the Solomons and Israel

I was an apprentice in horticulture when I was awarded my Playford Trust Award in 2007. I don't think I'd ever had a bank balance as large as the \$2000 that came with the award and it truly opened up a world of opportunities. I immediately benefitted from the networks and prestige associated with the Trust and my career has since involved a snowballing of opportunities.

I earned the title 'South Australian Apprentice of the Year' in 2008 and this exposure allowed me to become an intern in horticultural media with Michael Keelan on Radio 5AA and at

the same time begin a career as a Lecturer in Horticulture for TAFE SA.

In the years since, I have worked in horticulture around the world, touring the South African nursery industry and working with subsistence farmers in Tanzania. I took up a placement to manage a horticultural training body with AusAID, and this allowed me to live and work in the Solomon Islands for two years. Before getting too settled back in South Australia, I gained a scholarship that allowed me to work in Israel at the Jerusalem Botanic Gardens for nine months, where I worked with the region's rare plants and tropical conservatory stock. I was also able to visit Egypt, Jordan and Turkey and was asked to write about their horticultural enterprises for *Hort Journal Australia*, which I continue to do today.

I am now back working as a lecturer at TAFE SA and sit on the Board of the Nursery and Garden Industry of SA.



AUSTRALIAN ARID LANDS BOTANIC GARDEN

We are thrilled to welcome back as a Partner the **Australian Arid Lands Botanic Garden**, in Port Augusta, which was established in 1993 to research, conserve and promote Australia's arid zone flora.

The Trust recognises the importance of supporting trainees in regional Australia and has been able to assist in funding several trainees at the garden since 2013.

Support the Playford Trust

How partnering works...

Playford Trust Partners include respected SA businesses and industry groups, the tertiary and research sector, state and local governments, charitable foundations and individual donors. All funds provided by partners or donors go directly to the students. We work with the universities and TAFE to match students and research projects with each partner organisation's specific needs or, in the case of foundations and individual donors, their passion or preference.

Scholarships, grants and internships are made either in the donor's name or jointly with the Trust. The support of contributing partners is recognised in a variety of ways and organisations can be involved in determining the type of support to be provided, the selection of recipients and the monitoring of their progress.

While the Trust looks after all applications, administration and payments, we encourage interaction

between partners and scholars. Partner-student relationships can involve work experience, site visits, project work, mentoring or involvement in committees.

How you can help

If you're inspired by the students the Playford Trust supports, you might wish to consider a donation to add to the value and reach of our work.

For information about donations, bequests and partnering, please visit playfordtrust.com.au/funding.

To make a secure online credit card donation, simply visit givenow.com.au and then search 'Playford Trust'.



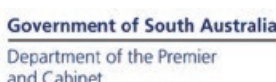
Welcome to our newest Board member, Jacqui McGill

Our newest Board member, Jacqui McGill, is a highly accomplished Executive and Non-Executive Director with more than 30 years of leadership experience.

She is the Chairman of TAFE SA, a member of the Economic Advisory Committee for SA and leadership consultant. Prior to joining the Playford Trust, Jacqui held a range of key leadership roles with BHP, including Asset President of Olympic Dam and BHP Mitsui Coal.

Jacqui serves on the Art Gallery of South Australia Board and joined the Trust in October 2018.

Our Partners



CONTACT US Our Executive Officer, Mary Anne Fairbrother can put you in touch with a Board member to discuss options for supporting the Trust's work. Contact Mary Anne by calling (08) 8429 5220 or email: MaryAnne.Fairbrother@sa.gov.au.

SUBSCRIBE to our eNewsletter to keep up-to-date with what's happening – www.playfordtrust.com.au/subscribe.

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Email: admin@playfordtrust.com.au **PLAYFORD TRUST NEWS EDITORIAL TEAM** Francene Connor, Bunty Parsons and Vicki Evans. Feedback from scholars and partners is welcomed – please send to admin@playfordtrust.com.au

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