

Playford Trust



Annual Review 2020

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

From the Chair: 2019 in review



2019 was a year of diversifying and expanding the scope of the scholarships and awards offered by the Playford Memorial Trust and its partners.

Our achievements included:

- Providing **financial support for 54 university, leadership and TAFE students**. In the coming year, this number is likely to increase significantly as new partnerships are formalised and more scholarships offered.
- The announcement of **10 new mining and petroleum scholarships** for 2020, with the support of the SA Government and our new partner, the SA Chamber of Mines and Energy (SACOME). There is also a commitment to expand this to a **\$2 million program over five years**. (See story below)
- A **new partnership** with specialist electrical and electronics engineering firm **Ultra Electronics** (see story page 15)

- An exciting proposal to join the South Australian Government in offering **40 new scholarships for Vocational Education Training (VET)** students in 2020 and 2021. This would broaden greatly the scope of the scholarships offered in the VET sector and encourage more students to take on vocational skills. Discussions are progressing well.
- In partnership with the Leaders Institute of South Australia, **seven community leadership skills scholarships** were awarded in the **Upper Spencer Gulf** region. In the coming year, we expect to offer up to eight similar awards in the northern suburbs of Adelaide.
- **29 partners** are now **contributing \$324,000** to our pool of scholarship funding for 2019/20. (All are listed on the back page.)

The partners of the Playford Trust play a vital role in ensuring we help train a wide range of young South Australians to advance their skills for the future development of the State. New partner Ultra Electronics, for example, is supporting an Honours scholarship in engineering, and is encouraging female and indigenous students to apply.

The primary purpose of each Annual Review is to shine a spotlight on the achievements of current and past Playford Scholars.

I always enjoy receiving updates from our scholars, learning about the fascinating work they are doing, and hearing about their commitment and contributions to our community, our nation and, in some cases, the world. Regrettably, we can't publish every report submitted but each is an important record of achievement.

The Trust's ever-growing list of achievements is in no small measure due to the fine work of our support staff – Vicki Evans, our Scholarship Executive; Mary Anne Fairbrother, who retired late in 2019 after many years of service as our Executive Officer, and Hayley Hasler, our current Executive Officer. Members of the Board continue to contribute countless hours of unpaid work and I take this opportunity to thank them most sincerely.

The Hon Dean Brown AO
Chairman

COVER

Double scholarship winner, Thomas de la Perrelle, at work in Nyrstar's Port Pirie smelter. Thomas was a 2019 Chartwells/St Ann's College/Playford Trust Residential scholar and won a 2020 Nyrstar/Playford Trust Scholarship, which included summer work experience. See his report page 10.

\$2 million program to unearth the future

A partnership between the resources sector, the South Australian Government and the Playford Trust will provide more than \$2 million in scholarships for students enrolling in mining and petroleum engineering at The University of Adelaide over the next five years.

This industry and government initiative recognises the growing demand for engineering expertise in these key areas of the national resources industry.

A total of 20 two-year scholarships will be awarded annually, and administered by the Playford Trust. For each scholarship funded by industry, the State Government has pledged an additional one of equal value. Each student will receive \$20,000 over the two years.

The winners of the first tranche of 10 scholarships are: Mining Engineering –

Sean Lancaster, Kimberley Wyatt Read, Olivia Wheeler, Brandon Musolino and Roman Tunno. Petroleum Engineering – **Henry Hill, Callum Martin, Harrison Parker, Aditya Murray and Luke Webb.**

SA Chamber of Mines and Energy (SACOME) CEO, Rebecca Knol, said the scholarships aimed to attract South Australia's most talented minds to an industry that is 'leading our technological future'.

"In addition to being at the cutting edge of innovation, the resources sector produces the materials that enable the boundaries of science to be challenged," Ms Knol said. "As we strive to decarbonise our future, these scholarship recipients will be instrumental in shaping the modern world."

"The resources industry provides employment for more than 26,000 South Australians, yet we are experiencing a skills shortage of petroleum and mining engineers. This is concerning for an industry that delivers



Rebecca Knol, SACOME CEO

\$6.4 billion in production, \$5.8 billion in exports and over \$300 million in royalties annually to South Australians."

The Minister for Energy and Mining, the Hon. Dan van Holst Pellekaan, said that mining and resources was an important growth area for the State and scholarship recipients would go on to well-paid and secure jobs.

Congratulations to our 2020 Scholarship Winners

The winners received their awards at a ceremony at Flinders University on Wednesday 8 April 2020.

Playford Trust



Playford Trust Regional Science & Engineering Scholarships

Ani Baker | Bachelor of Science (Advanced) (Honours) | The University of Adelaide

Holly Baldock | Bachelor of Science (Advanced) (Honours) | The University of Adelaide

Jessie Grundy | Bachelor of Engineering (Honours) (Biomedical) | Bachelor of Medical Science | Flinders University

Curtis Kleinig | Bachelor of Engineering (Honours) (Electrical and Electronic) | Bachelor of Business | University of South Australia

Paris Pauling | Bachelor of Science (Honours) (Enhanced Program for High Achievers) | Flinders University

Caitlyn Poel | Bachelor of Science | Master of Teaching (Secondary) | Flinders University

Adelaide Hills Council/Playford Trust Scholarship

Charlotte Mackenzie | Bachelor of Medicine | Bachelor of Surgery | The University of Adelaide

Aurecon/Playford Trust Women in Engineering Scholarship

Wendy Beeston | Bachelor of Engineering (Honours) (Electrical and Mechatronic) | University of South Australia

AusIMM/Playford Trust Minerals Industry Scholarships

Adam Freeling | Bachelor of Engineering (Honours) (Chemical) | The University of Adelaide

Kevin Grant | Bachelor of Engineering (Honours) (Chemical) | The University of Adelaide

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

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

Joshua Mason (Continuing Student) | Bachelor of Engineering (Mechanical) | Bachelor of Finance | The University of Adelaide

Codan/Playford Trust Scholarship

Mark Duffield | Bachelor of Engineering (Honours) (Electrical and Mechatronic) | University of South Australia

Coopers Brewery/Playford Trust PhD Scholarships

Ryan Edwards | School of Agriculture, Food and Wine | The University of Adelaide

Jack Kelly | School of Agriculture, Food and Wine | The University of Adelaide

Fay Fuller Foundation/Playford Trust Honours Scholarship in Health Sciences

Abbey Wehrmann | Bachelor of Clinical Exercise Physiology (Honours) | University of South Australia

GSA/Playford Trust Honours Scholarship in Earth Sciences

Kelly Macdonald | Bachelor of Science (Honours) (Mineral Geoscience) | The University of Adelaide

Nyrstar/Playford Trust Scholarships

Joshua Davis | Bachelor of Engineering (Honours) (Mechatronic) | University of South Australia

Amelia Johnson | Bachelor of Engineering (Honours) (Chemical) | Bachelor of Mathematical and Computer Sciences | The University of Adelaide

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

Jack Walsh | Bachelor of Engineering (Honours) (Chemical) | Bachelor of Finance | The University of Adelaide

OZ Minerals/Playford Trust Minerals Industry Honours Scholarships

Samantha March | Bachelor of Science (Advanced) (Geology) | The University of Adelaide

Brooke North | Bachelor of Science (Mineral Geoscience) | The University of Adelaide

Playford Trust Honours Scholarships – Flinders University

Matthew Hill | Bachelor of Engineering (Honours) (Electrical)

April Van Der Kamp | Bachelor of Science (Honours) (Biological Sciences)

Imogen Marshall | Bachelor of Science (Honours) (Biodiversity and Conservation)

Bradley Martin | Bachelor of Science (Honours) (Enhanced Program for High Achievers)

Jasper Willoughby | Bachelor of Science (Honours) (Marine Biology)

Playford Trust Honours Scholarships – The University of Adelaide

Jackie Arends | Bachelor of Engineering (Honours) (Mechanical) | Bachelor of Finance

Rhona Hamilton | Bachelor of Science (Advanced) (Honours) (Physics)

Thomas Lawler | Bachelor of Engineering (Honours) (Civil and Structural) | Bachelor of Finance

Sean McGowan | Bachelor of Engineering (Honours) (Mechanical) | Bachelor of Mathematical and Computer Sciences

Douglas Radford | Bachelor of Engineering (Honours) (Civil and Environmental) | Bachelor of Finance

Ragas Sachdeva | Bachelor of Computer Science (Honours)

Playford Trust Honours Scholarships – University of South Australia

Brent Hennekam | Bachelor of Engineering (Honours) (Civil)

Brandon Turner | Bachelor of Science (Honours)

SA Power Networks/Playford Trust Scholarship

Adam Cameron | Bachelor of Engineering (Honours) (Electrical and Electronic) | Bachelor of Mathematical and Computer Sciences | The University of Adelaide

Ultra Electronics/Playford Trust Scholarship

Harrison Bagley | Bachelor of Engineering (Mechatronics) | Bachelor of Mathematical and Computer Sciences | The University of Adelaide

WSP/Playford Trust Scholarship

Anna Ragg | Bachelor of Engineering (Honours) (Electrical and Electronic) | Bachelor of Mathematical and Computer Sciences | The University of Adelaide

Playford Trust PhD Scholarships

Alison Gill | School of Agriculture, Food and Wine | The University of Adelaide

Bradley Kirk | College of Science and Engineering | Flinders University

Jai Meyers | College of Medicine and Public Health | Flinders University

2019 TAFE SA Award winners

In November 2019, eight South Australian TAFE SA students received awards of \$2000 each to help them undertake further studies in their chosen fields.

Thanks to our valued partners, TAFE SA and Open Gardens SA, for helping us to support these deserving students.

Open Gardens SA/Playford Trust/TAFE SA Awards

Jason McVicar

Certificate III in Horticulture, Urrbrae and Barossa TAFE SA

Jason worked in a law firm for several years before moving to the field he loves – gardens. He now works for the City of Burnside with his own round of parks and gardens to look after.

He believes the leadership team gave him this responsibility in acknowledgment of his maturity, hard work and trustworthiness. His passion is turf management and he is looking forward to returning to TAFE SA to learn how to become a turf expert.

Peter Raine

Diploma of Conservation and Land Management, Urrbrae TAFE SA

Peter worked as an intensive care nurse before changing focus to the natural environment. In 2009, he began working for the National Parks and Wildlife Service, before switching to local government. He is now part of the Biodiversity Team at the City of Adelaide.

He wants to use his award to support his work in the conservation sector, and to continue to learn, teach and foster interest in conservation as both a professional and volunteer.

Rebecca Stevens

Certificate III in Horticulture, Urrbrae TAFE SA

Rebecca has a Bachelor of Applied Science in Human Movement and a Bachelor of Education. Teaching inspired in her a deep interest in environmental landscapes, regional biodiversity and the concept of paddock-to-plate, leading to her studying Horticulture.

She has enjoyed learning about soil qualities, plant nutrition, pests and diseases and says these foundational subjects have been instrumental in her career path in regenerative and sustainable agriculture. She is a founding member and co-ordinator of the Happy Patch Community Garden and The Happy Pantry Food Co-operative, and is now studying for a Bachelor of Agriculture.

Playford Trust/TAFE SA Awards

Christopher Callaghan

Diploma of Landscape Design, Urrbrae TAFE SA

Chris decided to pursue 'all things plants' in 2016 and set about completing a Certificate III in Horticulture, followed by Landscape Design and, most recently, a Permaculture Design Certificate at The Food Forest in Gawler. Previously, he worked in film and television production, and found these skills useful while working as Media Officer for Open Gardens SA.

As the 2019 recipient of the SA Mediterranean Garden Society's Sparoza Scholarship, Chris spent a month in Greece refining his approach to gardening in a Mediterranean climate. He plans to continue developing his own landscape design business, and to advocate for sustainable gardening practices.

Madonna Crossman

Diploma of Aquaculture, Port Lincoln TAFE SA

Madonna has worked on the family's oyster lease at Smoky Bay and developed a love for aquatic farming.

Although still at school, she has already earned Certificate IIs in both Aquaculture and Maritime Operations and in 2020 is studying Year 12 and a Diploma of Aquaculture at the same time.

All this has required exceptional time management and organisational skills, but Madonna believes the hard work will have been worth it because she should be well placed to get the most out of the Bachelor of Science she hopes to study at Flinders University.

Daniel Davis

Diploma of Horticulture, Diploma of Landscape Design, Urrbrae TAFE SA

Dan grew up on a farm on the Coorong. This environment – and a grandmother with a passion for plants – imbued in him a deep interest in nature and the land.

In 2016, he decided to complete his Certificate III in Horticulture. He has since gained his Diploma and, in 2020, will embark on a Diploma of Landscape Design.

Tyler Rogers

Certificate III in Landscape Construction, Urrbrae TAFE SA

Tyler lives and breathes gardening. This seed was planted many years ago when he first set eyes on his grandmother's conifer forest bonsai.

Since starting his gardening career with a week of Year 10 work experience, he has completed a Certificate III in Horticulture and a three-year traineeship at the West Beach Caravan Park. They asked him to stay on as a full-time groundsman and he has replanted and reinvigorated many existing gardens – and been recognised for his strong work ethic.

Leanne Williams

Diploma of Conservation and Land Management, Salisbury TAFE SA, Aboriginal Access Centre

Leanne Williams is a proud Buidig woman who has always loved nature. She has certificates in Animal Studies, Companion Animal Services, Training and Assessment, and Conservation and Land Management.

A deep desire to heal our country and its people led Leanne to pursue a Diploma in Conservation and Land Management. She works as a casual Animal Assistant at Gilles Plains TAFE SA and as a Horticultural Assistant at Urrbrae campus.



LEFT-RIGHT: Jason McVicar, Christopher Callaghan, Rebecca Stevens, Tyler Rogers, Leanne Williams, Madonna Crossman, Peter Raine, Daniel Davis.

2019 Regional Science & Engineering Scholarships



Breigh Angove

Bachelor of Secondary Education/
Bachelor of Science, Flinders University

In this first year of my Bachelor of Science, I managed to receive high distinctions for all my topics and have thoroughly enjoyed the subjects – especially the mathematics and chemistry topics, which have furthered my interest and passion for these areas.

I love having a full schedule – and university life has maintained that!

This first year has only cemented my career aspiration of becoming a secondary maths and science teacher in a rural community. However, I am particularly looking forward to the possibilities of doing international placements in my third and fourth year of my degree.

I would like to thank the Playford Trust for the scholarship I received this year. It truly has allowed me to focus more on my studies and has minimised the financial stress of living in a rural town for my first year of University.



Nicholas Graham

Bachelor of Science (Honours) (Enhanced Program for High Achievers), Medical Biotechnology, Flinders University

My first year of university introduced me to tertiary level biology, chemistry and

medical topics. I finished the year happy with my results, achieving seven high distinctions (and an annoyingly close to a high distinction grade). I also thoroughly enjoyed the learning involved in each of my topics, including components such as laboratory experiments, collaborative research projects, peer presentation and essay writing.

Coming from the country and moving to Adelaide to study at Flinders was a big step. It was in part made easier by receiving a Playford Trust scholarship, which reduced the financial strain. Living in the Flinders village, being close by to friends and like-minded people really amplified my academic interest and allowed me to further commit to my academic goals.

My goal is still to achieve my Honours in medical biotechnology and one day move into the field of disease research.



Jonte Reilly

Bachelor of Science (Space Science and Astrophysics), The University of Adelaide

Having completed my secondary education at Loxton High School, I moved to Adelaide at the beginning of 2019 to begin my tertiary studies. Although the lifestyle change from country to city was challenging at first, the support provided by the Playford Trust Scholarship eased the financial strain of shifting to new accommodation, allowing me to focus more on my degree.

Throughout the year, my love of both maths and physics continued to flourish as I met and worked with many others who shared the same passion for their studies as I did. Additionally, I was given the opportunity to explore previously unfamiliar fields of work, such as geology and computer programming. My favourite subject by far was astrophysics. It has always been one of my major interests and I dream of working as an astrophysicist for the Australian Space Agency some day in the future.



Henry Rogers

Bachelor of Science (Space Science and Astrophysics), The University of Adelaide

This year I began my study of Space Science and Astrophysics and have found it absolutely brilliant. I thoroughly enjoyed the astrophysics and physics subjects and am excited about what is to come. I managed to program in multiple languages, too, by taking up electives.

The biggest change has still been the countless differences between living in the city after growing up in a country town. While the experience has not been without some difficulties, it has been an incredible new world, and the Playford Trust Scholarship has certainly made parts of it easier.

I look hopefully towards the end-goal of a position at the Australian Space Agency when it is fully operational, although this year has also brought my attention to other equally interesting possibilities of employment, such as beginning a career with the Defence, Science and Technology Group.

Rebecca Pedler

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

This is a four-year degree aiming to develop students' research capabilities through project-based learning. My study plan involved chemistry, biology, statistics and research topics. I love understanding how different biological processes occur and the topics I enjoyed most included chemistry and molecular-based biology. The next two years will provide the opportunity to undertake a research project under the supervision of a university academic, and I am looking forward to that.

Coming from a small country town, adjusting to city life was most definitely the greatest challenge I faced. However, I enjoy the independence and opportunities that university life provides. My current career aspirations involve a research position in the aquaculture industry.

2019 Playford Trust Honours Scholars Research Reports

Cintya Dharmayanti

Bachelor of Biomedical Research
University of South Australia

Development of polymer-based bisphosphonate-eluting implants for the treatment of osteoporosis.

The bisphosphonate drug class is one of the first-line treatments for osteoporosis. However, when bisphosphonates are taken orally, only approximately one percent of the dose administered actually enters the systemic circulation for effect. My Honours research focused on the development of polymer-based subcutaneous implants that could overcome this bioavailability issue and release bisphosphonates over a sustained period, potentially improving patient compliance and efficacy.

During our study, we found that bisphosphonate release from the implants could be tailored over two to seven weeks according to (1) the polymer used, and (2) the concentration of bisphosphonate within the implant. The mechanisms of drug release from the implant were also investigated using various mathematical models.

In late 2019, I had the opportunity to present a poster of my work at the 37th Australasian Polymer Symposium on the Sunshine Coast. I was also fortunate enough to be ranked first in my Honours cohort for my contributions to this work. In the future, I would love to continue to contribute to biomedical research, specifically in the drug discovery and drug development sectors, to improve the treatment and wellbeing of patients across the globe.



Anthony Randell

Anthony Randell

Bachelor of Sustainable Environments
University of South Australia

Bacterial friends could help restore Adelaide's seagrass meadows

My research studied the bacteria that inhabit the roots and root zone of seedling seagrass (*Posidonia angustifolia*). The aim was to see if different bacterial communities could influence the early growth of these seedlings. We know that bacterial inoculations have helped with terrestrial revegetation and improved crop yield. With that in mind, could bacteria help with the restoration of Adelaide's seagrass meadows? Restoring these meadows would increase biodiversity and fish stocks, slow coastal erosion, and sequester carbon.

My results indicate that bacterial communities can indeed influence the root-to-shoot ratio of the seedlings and this raises the possibility that bacteria could be used to enhance seagrass restoration. Further research to identify beneficial bacteria could lead to an inoculum to boost the growth and/or the survival rate of *Posidonia* seedlings. My supervisors and I are planning to publish our results in 2020.

I found it fascinating looking into the complexities of the bacterial world – whole communities change over a miniscule distance from the root! I enjoyed raising my 'garden' of seagrass and hope my research will help to restore the meadows of these important ecosystem engineers.

Tristram Fyfe

Bachelor of Engineering (Chemical),
Bachelor of Finance, Flinders University

Ore – sorting out good and bad for life-of-mine optimisation

In minerals processing, the energy used in grinding is significant and represents a substantial cost. As the quality of new mineral deposits declines, miners are faced with higher processing costs. Ore sorters are technologies designed to upgrade the ore before processing, lowering costs in the plant. My research with The University of Adelaide and OZ Minerals optimises strategy for mining when ore sorting.

Sorting exploits natural variation in ore quality to upgrade ore. This may mean that lower grade ore bodies can be processed economically, therefore optimising – or effectively increasing – the size of the mine. We developed a model which simulated the operation of a block cave and copper concentrating plant, determining a life-of-mine valuation for a large number of mine designs.

The results indicated that the economics of sorting are site-dependent. At the Oz Minerals Carrapateena copper-gold resource north of Port Augusta, sorting performance was limited by the presence of gold, which could not be sorted as effectively as copper. It is expected that my research will provide a framework for decision-makers to evaluate sorting technologies and optimise value.

Samuel Tonkin

Bachelor of Science (Enhanced Program for High Achievers)
Flinders University

Room temperature repair, recycling and additive manufacturing of polymers prepared through inverse vulcanisation

Plastic pollution is one of the greatest issues facing modern society. Every year, more than 300 million tons of plastic is produced, while less than nine percent is recycled. Almost every ecosystem on Earth could be impacted for hundreds of years because of the low biodegradability of most common plastics.

While some plastic recycling techniques exist, they often involve heating for prolonged periods of time, resulting in energy costs that far outweigh the cost of producing virgin plastic. For plastic recycling to become common, the cost of energy involved must be reduced so there is an economic incentive to recycle rather than synthesise new product.

My research is based on developing ways to recycle and repair plastics at room temperature, with no energy cost from heating. I found that nucleophiles can induce a rapid and reversible reaction with polymers prepared through inverse vulcanisation. This allows the polymer to be reversibly broken down and reformed into a new shape, for a new purpose, at room temperature.

Through mechanistic model studies, it was found that this reaction is catalytic, and the nucleophiles can be removed and used for further recycling reactions.



Samuel Tonkin

Jenna Draper

Bachelor of Science (Honours) (Ecology & Evolutionary Science)
The University of Adelaide

Using sexual dimorphisms to understand dioecious plant reproduction and ecosystem significance

Dioecious plants are distinct male and female individuals, which in an organism incapable of moving presents unique challenges for reproduction and conservation. My Honours project investigated how sexual dimorphisms in native coastal *Lomandra leucocephala* ssp. *robusta* (found at Tennyson, near Adelaide) can alleviate these challenges. I combined ecological statistics and chromatographic techniques to find out how male and female plants differ physically and chemically. The sexual dimorphisms I found indicated pollination by generalist insects that manipulated pollinators to transport pollen efficiently from male to female plants.

Population life class studies found that weeding likely stimulates population growth, as the Tennyson population increased from 40 to 258 individuals over five years, predominantly in areas cleared of invasive grasses. Generalist pollination combined with hardy growth indicate that this species has key roles in supporting lower trophic levels and stabilising the sand dunes. This protects insect populations as well as populations of insectivorous native reptiles and birds.

Throughout 2019, I worked closely with the Tennyson Dunes Group, and was invited to be a guest tour guide at their annual Open Day. I enjoyed sharing my passion for conservation with others, and I will continue to do so during my PhD studies.



Jenna Draper



Susanne Sahlos

Susanne Sahlos

Bachelor of Science (Nanotechnology)
Flinders University

Optimisation of carbon nanotube technology-based X-ray tube production for mobile imaging devices

The development of light-weight mobile X-ray units plays an important role in improving patient outcomes in general and military hospital settings, as well as aged care facilities. Novel carbon nanotube (CNT) technologies have enabled the development and production of such devices at the medical imaging firm Micro-X, located at the Tonsley Innovation Precinct. The miniaturisation of these X-ray units is facilitated by cold cathode field emission, which eliminates the need for bulky cooling systems used in traditional X-ray equipment.

During my Honours research, I analysed the interfacial adhesion between cathode components, with the aim of testing stainless steel as a new CNT supporting metal substrate. The project was both challenging and rewarding. A highlight was being able to use Focused Ion Beam (FIB) cross-sectional analysis of my samples at Adelaide Microscopy. As a result, I was able to identify the importance of exposing the steel substrates to different heat treatments under varying levels of ultra-high vacuum (UHV) in order to achieve good CNT adhesion. Although further research is required, my findings will assist the choice of materials used in future X-ray tube development at Micro-X.

2019 Playford Trust Honours Scholars Research Reports



Keshika Alagiyage

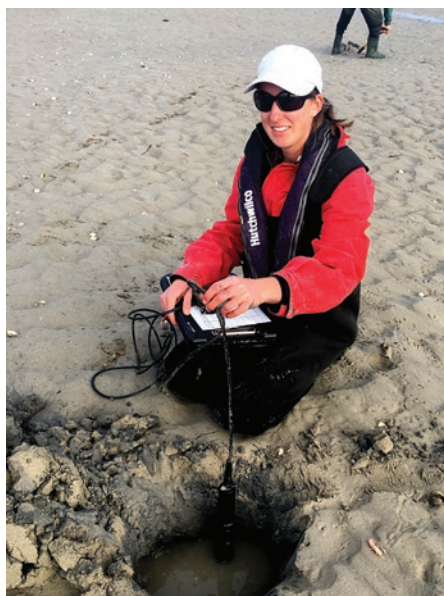
Bachelor of Engineering (Chemical and Pharmaceutical), The University of Adelaide

Developing a chemical sensor for mineral flotation processes

Most mineral extraction processes use the froth flotation method, whereby desired minerals are separated from gangue minerals using specialised flotation reagents. Precise control of these reagents is essential, especially when processing the complex, low-grade ores that are becoming increasingly common due to the continually increasing demand for minerals.

In recent years, molecularly imprinted polymers (MIPs) have emerged as selective sensing materials that can be tailored for a target analyte. These MIPs have been integrated with quartz crystal microbalances (QCMs) to yield highly selective, mass-sensitive sensors. Such a sensor could significantly improve the control of flotation processes to afford better recovery and quality in the final mineral concentrate. The sensor can also be used to monitor the composition of residual reagents in plant waters to help reduce the environmental impact of the separation process.

In my project, I was successfully able to synthesise MIP particles that were selective for a representative flotation reagent. This lays the foundation for developing a MIP-based QCM sensor for real-time monitoring of flotation processes. Future work will involve integrating the MIP particles as a recognition layer on the QCM sensor and calibrating the sensor response to the concentration of a target reagent in a flotation stream.



Laura Schroder

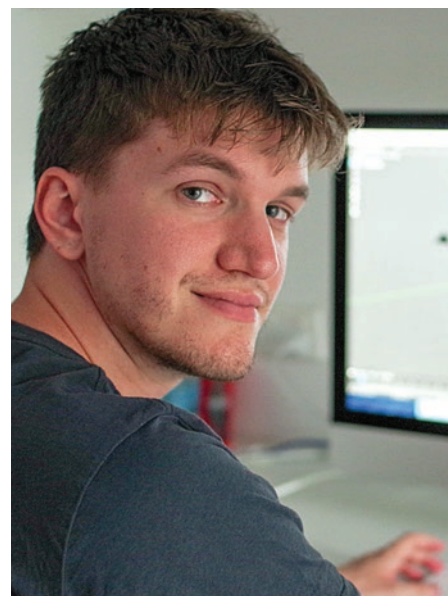
Bachelor of Science (Biodiversity and Conservation) (Enhanced Program for High Achievers), Flinders University

Investigating groundwater discharge in South Australia

The discharge of groundwater into coastal embayments is a global phenomenon. In addition to acting as a freshwater resource in a saline environment, groundwater can carry anthropogenic nutrients into these environments, potentially influencing fauna. My project provided a baseline insight into the influence of groundwater discharge on marine communities at Coffin Bay on Eyre Peninsula.

Groundwater seeps were detected in the bay and sampled during winter and spring. I carried out surveys for both macroinvertebrates (the small critters living in the sediment) and fish fauna. I also measured various environmental conditions in the field and collected sediment and water samples.

In winter, the seep water had distinctive low salinities, five times lower than seawater. Consistently, I found high abundances of particular crustaceans, namely amphipods, in the vicinity of groundwater seeps. No apparent effects on the fish fauna were seen, which may reflect the small nature of the groundwater seeps, or dissipation with tidal currents. Further investigation is needed to elucidate the contribution of nutrients originating from groundwater, given the high background nutrient levels sampled. This was an important finding to inform the need for future assessments, as nutrient loads may be affecting nearby seagrass meadows that are important nursery grounds for fish.



Matthew Evans

Bachelor of Engineering (Software), Bachelor of IT (Digital Media) Flinders University

Investigating the combination of brain-computer interfaces and virtual reality training in rehabilitation

I set out to investigate the feasibility of combining a brain-computer interface (BCI) device with virtual reality (VR) training techniques for the purpose of motor rehabilitation after a significant brain injury. A brain injury can significantly restrict a person's physical movements and often victims of a stroke or brain injury will go through a process known as neurorehabilitation, where lost motor function must be relearned through guided exercise.

I hypothesised that by combining VR training, where the user wears a headset that provides a stereoscopic display and positional tracking, and BCI technology, a device which attaches to a person's scalp to read and interpret brain signals, neurorehabilitation techniques could be improved. Using the template of mirror therapy, a real-world neurorehabilitation technique where a mirror is used to give the illusion of movement in an affected limb, I constructed a VR game in the Unity Game Engine. I used the open-source software package OpenVibe to analyse and interpret brain signals gathered from a device attached to a participant's scalp.

While the accuracy of the BCI device was shown to be quite limited, my thesis outlined a functional combined BCI/VR application pipeline and framework, and demonstrated the feasibility of combining these two devices into a unified application.

Andrew Du

Bachelor of Engineering (Electrical and Electronic), University of South Australia

Attacking deep neural networks with adversarial examples

In the past few years, newly developed deep neural networks have reignited the field of artificial intelligence. These networks have helped solve many challenging machine learning problems, such as image classification, speech recognition and machine translation. As a result, they are currently being used to develop automated driving systems; analyse cancer cells in patients; improve security via biometric authentication; assist mobile phone users via a voice controlled personal assistant; and even play games like Chess, Shogi and Go at superhuman level.

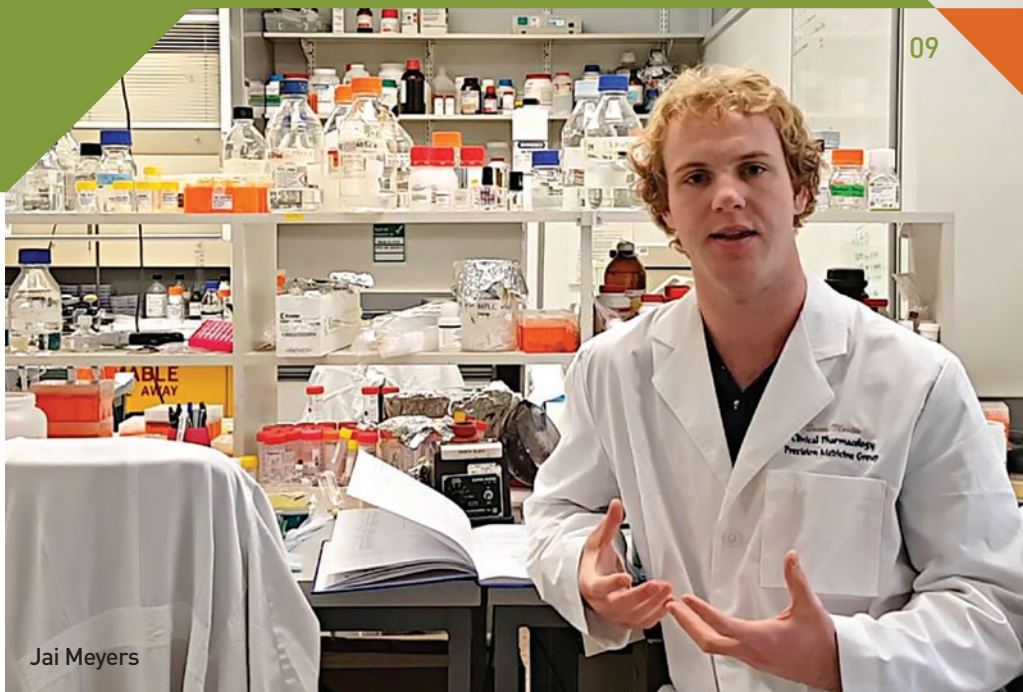
However, it has been discovered that these networks are vulnerable to adversarial examples – carefully crafted inputs aimed to fool machine learning systems into making incorrect predictions.

The aim of my research was to examine the effects of adversarial examples on deep neural networks performing image classification. This involved performing a comprehensive literature review in the field of adversarial machine learning; model design and training on standard computer vision datasets; and building a test environment to evaluate model performance on some state-of-the-art methods of generating adversarial examples.

The results demonstrated how easy it is to fool deep neural networks with adversarial examples and underscored the threat it poses in practice. This project, along with my desire to understand the complexity of the human brain, has inspired me to pursue this area of research by undertaking a PhD in the School of Computer Science at The University of Adelaide.



Andrew Du



Jai Meyers

Jacob Dalglish

Bachelor of Science
University of South Australia

Evaluation and characteristics of electrochromic two-polymer systems

My Honours project involved the investigation of electrochromic polymers. These materials are able to change their colour with an applied voltage, with different types exhibiting different colours.

I explored the two-polymer systems of these materials by synthesising two together at the same time. The benefit of doing this is to provide a greater range of colours for application purposes. Applications can include active camouflage and smart glass. One polymer I investigated, named PEDOP, provided poor electrochromic properties on its own, but when formed with another named PEDOT, provided greater capabilities and unique colour switching between grey and transparent states.

I also found that the two polymers formed as a co-polymer when produced. This was previously unknown, and the aim is to publish this finding. This project gave me an opportunity to continue working with the Future Industries Institute in the hope of being able to undertake a PhD in the same field.



Jacob Dalglish

Jai Meyers

Bachelor of Science (Enhanced Program for High Achievers), Flinders University

Characterising the novel role of uridine diphosphate-glycosyltransferase enzymes in breast cancer lipid metabolism

Uridine diphosphate-glycosyltransferase enzymes (UGTs) are a superfamily of drug metabolising enzymes responsible for the control of intracellular molecular substrate levels. Research has suggested that several UGTs, including UGT2B11 and UGT2B28, are associated with breast cancer progression, however their mechanism of action remains unexplored.

Lipid biosynthesis is an essential cellular process which is frequently dysregulated in cancerous cells. The sterol regulatory binding protein (SREBP) transcription factor family is responsible for the control of all genes associated with lipid metabolism. The expression of UGT2B11 and UGT2B28 has been highly correlated with SREBP-target gene expression in breast cancer and so my Honours project focused on characterising the potential role of these enzymes in SREBP-mediated breast cancer lipid biosynthetic pathways.

In vitro studies in breast cancer cell lines showed that over-expression of these enzymes increased the expression of SREBP-target genes. These changes were associated with an increase in cellular proliferation, suggesting that these enzymes may be promoting proliferation through increased lipid biosynthesis. Further work is necessary to elucidate the molecular mechanisms underpinning these pathways, which may ultimately allow these UGTs to be developed as biomarkers or drug targets for the diagnosis or treatment of breast cancer. I will continue working on this project during my PhD candidature at Flinders University in the Department of Clinical Pharmacology.

2019 Playford Trust Partner Scholarships Research Reports



AusIMM/Playford Trust Minerals Industry Scholarship

Adam Zanardo

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

Predicting the future in oil fields

I presented my Honours project at The University of Adelaide's 2019 *Ingenuity* showcase. It was about using current techniques in the petroleum industry to forecast oil production in a specific type of reservoir. The reservoir I described was characterised by a high recovery factor of oil. Current techniques, specifically decline curve analysis, were applied to the reservoir and expanded upon, using statistical analysis to provide forecasts that are more representative of the reservoir.

The main findings of the research were an empirical model and a forecasting tool specific to the reservoir investigated. The empirical model could be used to provide more representative forecasts in

the future. The forecasting tool developed was necessary to ensure consistency when multiple people are involved in forecasting oil production.

I look forward to pursuing my passion for the minerals industry with a graduate role as a mining engineer with Glencore at Mount Isa Mines. I am excited about finally putting my knowledge from university into practice.

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

Thomas de la Perrelle

(pictured front cover)

Bachelor of Engineering (Honours)
(Mechanical) with Bachelor of Science
The University of Adelaide

I am entering my third year of a Bachelor of Engineering (Honours) (Mechanical) and Bachelor of Science, double majoring in Experimental and Theoretical Physics at The University of Adelaide. I currently live at St Ann's College, where I work in pastoral care and student support as a residential tutor.

During 2019, I finished my pure math subjects and learned about specific design criteria for common mechanical components. I also studied relativity and quantum mechanics – an insightful contrast to my engineering classes. Thanks to receiving the 2020 Nyrstar/ Playford Trust Scholarship, I worked in the Mechanical Reliability Team at the Nyrstar Smelter in Port Pirie over the summer.

I have accepted the position of 2020 Senior Tutor at St Ann's College, a role akin to that of Vice Principal. It will allow me to effectively support my fellow students as they transition from school leavers to young professionals – something that I enjoy greatly.

After finishing my degrees in 2022, I will seek employment in the space industry,

either private or government. Without the Playford Trust's support, the experience Nyrstar has offered, and the soft-skills and professionalism I have developed at St Ann's, I certainly would not be as well-placed as I am in attempting to enter this field.

GSA/Playford Trust Scholarship in Earth Sciences

Teagan Romyn

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

There and back – Do rocks record their journey to the centre of the Earth?

My Honours project revolves around ultra-high-pressure metamorphic terranes. These massive areas have journeyed deep into the Earth – but only parts of them tell the tale!

The sets of minerals (mineral assemblages) within rocks change when they are heated and pressurised, thereby indicating how deep and hot the rocks were. Approximately 95% of the rocks in ultra-high-pressure metamorphic terranes fail to record deep earth processes. My research aims to understand why these rocks are so unreactive, and it has implications for paleoenvironment reconstructions and understanding our planet's tectonic history. After six months of study, my results have revealed that fluid plays a crucial role in rock reactivity in my field area – Lavik, Norway.

The Geological Society of Australia/Playford Trust Scholarship enabled me to travel to Norway; present at the 2019 conference of the Structural Geology and Tectonics Specialist Group in Port Lincoln; and be an active member of GSA's SA Division. These activities have inspired me to pursue my passion in geoscience communication. As a geoscientist, I aspire to use my unique skillset to be a part of the climate change solution in Australia.

Seeley International/Playford Trust Scholarship

Monica Elgindi

Certificate IV in Refrigeration and Air Conditioning, TAFE SA

Since receiving the scholarship to undertake my Certificate IV in Refrigeration and Air Conditioning, I have been able to inspire and mentor young apprentices at SA-based Butterfields Services. As my studies develop, I am also applying the knowledge I am gaining to help improve my fault-finding and diagnostics skills in the field. Winning this award has given me more

confidence, as well as the tools to encourage other students to continue their studies beyond their apprenticeship.

I would like to use my growing skill set to nurture and support apprentices across all trades. I have enjoyed networking and sharing my experiences and, thanks to support from TAFE SA, I have had opportunities to speak to students in pre-vocational courses. I have struggled with time management while studying and working full time, but I have a great team of supervisors at Butterfields who will help me overcome this challenge in 2020.



Chartwells/St Ann's College/Playford Trust Residential Scholarships – Commencing Student

Lachlan Ryan

Bachelor of Engineering (Honours)
(Mechanical and Sustainable Energy)
The University of Adelaide

I am studying a Bachelor of Engineering (Mechanical and Sustainable Energy) and have now completed my second year. It was quite a step up from first year and I definitely found it difficult, especially trying to balance it with my sport commitments. However, I got through the year healthily – and achieved satisfactory results.

In first semester I really enjoyed the challenge of my engineering math subject, split into two sections – statistics and

differential equations. I found differential equations to be really interesting and rewarding, and this aspect of the topic was built upon in second semester, when I also tackled the most interesting subjects so far, dynamics and control. Learning how to analyse linkages and also apply control system methods was challenging but enjoyable.

I am excited about moving into the next year of study as it will involve several subjects that focus on renewable energy, which is the career direction I am pursuing. Over the summer I secured a work placement at SAGE Automation which went well, and it was great to see what it is like working in industry.



Lachlan Ryan



Taylor-Jade Woods

Fay Fuller Foundation/ Playford Trust Honours Scholarship in Health Sciences

Taylor-Jade Woods

Bachelor of Medical Science (Honours)
Flinders University

30-day readmission rates and costs for atrial fibrillation patients in Australia

My Honours project focused on 30-day unplanned readmissions in patients with atrial fibrillation (AF), the most common cardiac arrhythmia. My thesis addressed three questions: 1) How many AF patients unexpectedly return to hospital within 30-days? 2) How much do these episodes of care cost? and 3) What factors influence those costs?



Oliver Russell

I found that almost one in seven AF patients experienced an unplanned readmission within 30-days, at a cost of \$7,009 per readmission. More than 40 percent of these patients returned to hospital with a recurrence of AF. Many patient factors influenced readmission cost, particularly comorbidities and procedures.

My research is the first to illustrate the economic burden of AF in Australia and suggests that, to reduce it, priority should be placed on reducing the 30-day unplanned readmission rate.

During the year, I published my first paper and was nominated for the best Honours presentation. I achieved Honours First Class and I am currently at the Basil Hetzel Institute working on two more papers focusing on the clinical and economic

significance of AF. Support from the Playford Trust and Fay Fuller Foundation encouraged me to pursue my interest in cardiovascular outcomes and public health.

Adelaide Hills Council/ Playford Trust Scholarship

Oliver Russell

Bachelor of Science (Honours) (Geography)
Flinders University

I have completed an engaging and enjoyable year exploring many of my interests in the field of geography. It's been a wide-ranging foray into Earth and Environmental Sciences, Public Health, Demography, Remote Sensing, Sustainable Development and Human Geography.

With support from the Playford Trust and the Adelaide Hills Council, I've been given the opportunity to throw myself into exploring these interests, and I was rewarded with the John Lewis Prize for First Year Geography. Studying these rich areas of geography has allowed me to see how these interests might develop into passions.

This first year at Flinders has guided me through the first steps of a range of paths towards future careers and study. International development, sustainable urban and regional planning, and teaching particularly stand out. I look forward, with excitement, to furthering my studies – and these interests – in 2020, which will include a semester spent on exchange at Stockholm University, Sweden.

2019 PhD Scholars Research Reports

Playford Trust PhD Scholarship

Andrea Bertram

Fisheries Genomics, School of Biological Sciences, Flinders University

Examining the DNA of snapper to improve their management in Australia



DNA contains invaluable information for effectively conserving and managing populations and species. In my PhD I am generating thousands of DNA sequences from snapper caught by fishermen across the

southern half of Australia, between Carnarvon in Western Australia and Rockhampton in Queensland.

I am examining these sequences to characterise the similarities and differences in the DNA of snapper across the entire range of this iconic marine fish. This information will be used by fisheries scientists to review boundaries of the current management areas for snapper in Australia.

I will also use the DNA sequences to investigate genetic diversity and population size to provide valuable advice to scientists about the condition of our snapper populations. Overall, my project will improve management arrangements for snapper in Australia and is therefore important for the long-term sustainability of this economically, socially and ecologically important species. The project also presents an exciting opportunity for me to connect and work with fisheries scientists across the five mainland states of Australia.

Playford Trust PhD Scholarship

Nicholas Booth

Biotechnology, School of Biological Sciences Flinders University

The elusive carbon and nitrogen transporters of the legume symbiosome membrane – the first step to improved nitrogen fixation



Global food security is one of the most pressing issues in today's society. Legumes are a sustainable alternative to meat products, and have a higher nutritional value than cereal crops. Legumes have

also developed a symbiotic relationship with a soil bacterium that converts atmospheric nitrogen to a form usable by the plant. With this capacity, legumes in a sense provide their own source of nitrogen fertiliser.

In this relationship, the plant surrounds the bacteria with a membrane of its own origin and provides the bacteria with carbon for its growth, and in return the bacteria provides the plant with nitrogen. This membrane is impermeable to both of these nutrients, but protein transporters exist to facilitate the movement across the membrane. My project aims to identify the carbon and nitrogen transporters to improve the efficiency of this symbiotic relationship, and perhaps move it into other crop species. My research has identified strong candidates for both of the mentioned transports, with data suggesting we are on the right track.

During 2019 I presented my research at the Legumes for Sustainable Agriculture and Australian Society of Plant Scientists meetings. These have been great opportunities to network, establishing collaborations with leading Australian universities.

Thomas Foods International/ Playford Trust PhD Scholarship

Niki McCarthy

School of Animal and Veterinary Sciences The University of Adelaide

How to increase the survival rate of newborn lambs



I commenced my PhD in February 2019 at the Roseworthy campus. My project, in conjunction with SARDI and Meat and Livestock Australia, aims to increase the survival rate of newborn lambs. This is a significant

opportunity. I was amazed to learn that over 17 million lambs die each year in Australia – most from being underweight and unable to survive the first three days of life. My PhD aims to increase lamb birthweight by giving ewes various nutritional compound supplements in the latter stages of pregnancy, a critical time for lamb foetus development.

Over the past four months I have hand-fed over 100 pregnant ewes, with my first group of 50 having recently lambed. The lambing process is an intellectually and physically challenging period for researcher and sheep alike. The ewes are monitored around the clock, which means the constant watching of individual animals, interspersed with snippets

of sleep in a freezing cold shed with research colleagues!

A range of samples (weight, temperatures, morphology) are taken from the lambs before tagging and release back into the paddocks. Ewes and lambs are monitored through until weaning at three months of age to record weight gain and other important measures.

I am thoroughly enjoying my research and gratefully acknowledge Thomas Foods International for the scholarship I received which has allowed me to balance my university commitments with running around two small children (who absolutely love the lambs!) and I am looking forward to examining my research results later this year.

Playford Trust PhD Scholarship

Yazan Arouri

Australian School of Petroleum The University of Adelaide

Well control, location and trajectory optimisation under geological uncertainty



With the technological advancements in common computing power, there has been a push for a digital revolution in the resources industry. More recently, oil and gas companies are increasingly investing in the development of computer-assisted

optimisation algorithms for well control, well placement and trajectory.

Several studies have indicated that an increase of up to 20 per cent in monetary returns can be attained with no additional capital expenditure. The general aim of optimisation techniques is to maximise a defined objective, such as monetary returns, by testing a large number of solutions within a limited time span. However, current algorithms are impractical due to the computational expense, including the time required to find the best solution.

My research is aimed at addressing this computational efficiency issue by developing and applying algorithms using the increase in personal workstation computing power to larger, more complex resource development cases.

Over the past year I have been developing an algorithm for the production optimisation of oil wells in large three-dimensional models. These results are extremely promising, with my proposed algorithm requiring much lower computational costs for a better solution.

Continuing PhD Scholars – Research Reports



ABOVE: Research visit side trip: Katie Gates at Lac aux Américains, Quebec, Canada.

2018 Thyne Reid Foundation/ Playford Trust PhD Scholarship

Katie Gates

Molecular Ecology Laboratory, College of
Science and Engineering, Flinders University

Feeling the heat in the tropics: adaptive resilience of an Australian rainbowfish

Understanding how organisms will respond to changing climate is a major priority for ecological research. Local adaptation can influence the ability of organisms to respond to certain climatic variables, however the genetic and physiological mechanisms are not yet understood.

Using rainbowfish as a study system, my project uses a combination of evolutionary landscape genomic, gene-expression and morphology-based approaches to identify processes contributing to diversity and resilience in the tropics. Genomic analyses have demonstrated concordance between rainbowfish population structure and hydrological catchments. However, this pattern was not reflected in analyses of body shape, which showed significant differences between rainforest and savannah ecotypes but not between catchment areas within these biomes. This may suggest that morphological variations relate more closely to environmental adaptation than neutral or stochastic processes. Upcoming genotype-environment and phenotype-environment association analyses will further interrogate this hypothesis.

My year's highlights include a co-authored manuscript submission to the multi-disciplinary journal *Proceedings of the National Academy of Sciences*, and an international research visit to the laboratory of my adjunct supervisor, Prof. Louis Bernatchez,

at Université Laval in Quebec, Canada. This visit allowed me to integrate new analysis methods and strengthen inter-institutional collaborations and was, in great part, possible thanks to the ongoing support from the Thyne Reid Foundation and the Playford Trust.

2018 Playford Trust PhD Scholarship

James Dorey

College of Science and Engineering,
Flinders University

Uncovering Australia's new native bee species

This year has been very busy with bee collecting and sorting across the east coast of Australia. This work is part of a really important project that aims to DNA barcode as many Australian native bee species as possible.

Estimates of the total diversity that we have included in this project top 1000 species – more than half of the described bee fauna in Australia – although the sequencing is not yet complete. I have even found a bee genus that has not been seen in Australia for almost 100 years.

I have published the first chapter of my thesis, describing nine new species of Fijian bee and revising the four previously described ones. I have also been involved with the review of the Australian *Leioproctus* (*Colletellus*) and *Amegilla* (*Asaropoda*) – the teddy bear bees.

I am continuing to work towards both my PhD publications and other research with the aim of increasing our understanding of Australian bee fauna and their importance to both native and agriculture ecosystems.

2017 Playford Trust PhD Scholarship

Robert Trott

Biomedical Engineering,
Flinders University

Getting people to walk again after stroke using robots to rewire the brain

Losing the ability to walk and having reduced mobility after a stroke results in a massive loss of quality of life for many individuals. Robotic exoskeletal legs have been introduced as a therapy option to help patients regain the ability to walk, however their usefulness is being questioned and their superiority to conventional therapy is unknown. The way these devices are controlled is far more important than initially thought, and is the basis for my work.

I am designing an intuitive controller that will enhance patient participation in rehabilitation that incorporates robotic devices, and it should lead to better long-term patient outcomes. Key to the success of the controller is developing an ultra-compact sensor – it cannot be made without it! The sensor has presented many technical challenges, resulting in a lot of learning about fields outside my area of expertise.

In the near future, I will conduct a study to further verify the method of control and inform the future design and application of the controller. The research will be conducted in a motion analysis laboratory, where I will be able to analyse participants movements and assess their suitability for control of robotic legs. This will result in a better controller.



Partners and Scholars working together

Women in engineering

Aurecon, in partnership with the Playford Trust, has established the Women in Engineering Scholarship to help encourage top female talent to pursue engineering careers in a traditionally male-dominated industry.

This will help Aurecon to increase diversity of thought, develop innovative solutions, serve their clients, and solve some of the world's most complex challenges.

In 2019, University of Adelaide structural engineering student **Ashleigh Chin** was the first recipient of this new award. Ashleigh attended Unley High School before deciding to study a Bachelor of Engineering (Civil, Structural & Environmental).

Motivated by her love of maths and science and the difference she could make to complex issues such as a city's livability and climate change, Ashleigh completed her studies and an eight-week internship with Aurecon as part of her scholarship. "What I like about



engineering is that it's tangible and, in a way, I get to shape a city's character. I also like to know that the projects I work on help improve people's lives and can help to solve some of our big challenges," Ashleigh said.

"During my internship with Aurecon I was able to work on real-world projects. The first was a modelling and movement study on Victor Harbor's Cockle Train railway line to determine how train loads would affect the strength and safety of its bridges. I was lucky enough to do similar bridge assessments on a major Melbourne tunnel project which will reduce congestion.

"What I really love about working at Aurecon is the fact that they have quite a few senior leaders who are women – and the company genuinely values creating a diverse and

inclusive workplace. I'm so grateful to both Aurecon and the Trust for providing these scholarship opportunities."

Aurecon Regional Managing Director for South Australia and Victoria, Angus Leitch, said that it was important to encourage more women to embark on STEM careers.

"Leading design doesn't come from a group of people who are the same," he said.

"It's diversity, in all its forms, that drives different thinking and innovation. The scholarship is one way that we're helping local South Australian women enter STEM careers.

"It was great to have Ashleigh on board, and to see a local working on bringing to life some South Australian projects, too. We were also delighted to offer Ashleigh a full-time graduate role at the end of her internship."

Network innovation

SA Power Networks has worked with the Playford Memorial Trust for a number of years now, and in recent years has started offering work experience placements to the winning candidates.

As our Network Innovation Centre is focused on researching the new energy future, Playford Trust students such as **Liam Mallamo** have gravitated there and helped us add to the picture we are building of a distributed network heavily influenced by renewables.

The value of the program is demonstrated in the fact that Liam has been recruited in our new graduate intake in 2020.

Our graduate program offers engineering graduates a four-year placement in which they rotate through many areas of our business, from substation design to emergency management. Indeed, many of our graduates have gone on to leadership positions within SA Power Networks – Kylie Kerrigan, Manager, Sponsorship and Events, SA Power Networks.



ABOVE: Liam Mallamo (centre) with colleagues on his first week of induction in the SA Power Networks Graduate program. Photo credit: SA Power Networks.

Time to shine

WSP has partnered with the Playford Trust since 2013 and this year Douglas Radford was the scholarship recipient.

"Doug has been an outstanding scholarship candidate and we have really enjoyed having him join our water team for work experience as part of the scholarship. So much so, that we offered him an internship role at the end of last year," said Sarah Hughes, the Water Team Leader for WSP.

Doug joined WSP over the summer break, bringing great energy into the work place and an eagerness to learn as much as he could. He has since started to think about his longer-term career journey. WSP's Adelaide Water team have really enjoyed working with Doug and giving him the opportunity to work on a range of different projects; from network modelling, pipeline concept design to developing project management plans.

In Doug's final year of study, he will take part in an Honours research project looking at the impact of heatwaves on modern society, and how heatwave risk may be quantified across a range of industries. The topic is highly relevant to South Australia in the face of a changing climate. His group is currently in the process of publishing an initial literature review of this topic to the Encyclopedia of Sustainability Science and Technology.

News from the Board & New Partners

Top order, rock solid contributors

Two Playford Trust Board members have been honoured for their career contributions to the resources industry.



In January, **Jacqui McGill** became an Officer of the Order of Australia (AO) in recognition of her service to the minerals and mining sector, for changing attitudes and workplace culture, and for her commitment to gender equity and workplace diversity. In February, The Advertiser ranked her as seventh in its list of the 50 Most Influential People in South Australia.

In May, **Keith Yates**, one of the pioneers of the SA minerals sector, was honoured by the Australasian Institute of Mining and Metallurgy (AusIMM) for his contribution over six decades.

Jacqui spent 30 years breaking down the barriers in the male-dominated resources industry, including at BHP where she spent the 17 years to 2018: the last three as asset president of the giant Olympic Dam mine.

While pleased with her professional achievements, in a story in The Advertiser she said she was particularly proud of her contribution to developing workplaces that support and celebrate diversity.

"I started in the (mining) business in 1988 – it was a very different world," she said. "If you look at what I experienced it wasn't unique at the time but if you heard it today you'd be quite shocked."

"Over 30 years the industry has changed and if I've played a part in that then I'm incredibly proud of my contribution."

"The industry presents an opportunity for young women to pursue a rewarding and varied career. Never shy away from a challenge because they really are just opportunities to stretch yourself and achieve something pretty special."

"I've lived all over Australia and the world and been able to learn about some great communities."

Jacqui remains incredibly busy, not only with the Trust but as Chair of TAFE SA; a member of the Premier's Economic Advisory Council; and as a director of the Art Gallery of SA. She also runs her own consulting business.

When Keith was asked by The Advertiser to reflect on his career, he recalled that a passion for science had led him to nominate for maths, physics and chemistry at university, but with a fourth subject still to choose.

"I didn't know anything much about geology but I thought I'd give it a crack," he said. "From there on I was hooked. It became my passion."

Keith began his career with Geoscience Australia and worked in the Gulf of Carpentaria, northern Queensland and Papua New Guinea. He moved to South Australia in 1970 before Olympic Dam had been discovered. His roles in a range of companies have included chief geologist, exploration manager, group executive and chief executive.

He ran Australian Development Limited, a subsidiary of the legendary Poseidon Group, which made a significant high-grade gold discovery near Tennant Creek in the Northern Territory. He was also a founding director of Adelaide Resources, which went on to discover rich mineral sands in the State's far west, as well as gold and iron deposits.

Keith remains active in the industry, serves as a member of the South Australian Minerals and Petroleum Expert Group, and says his fascination for mining has not waned. "If you have an interest in leading an outdoor life instead of being chained to a desk or computer screen, you have plenty of scope," he said.

"There is a never-ending demand for metals – especially for the manufacture of smart phones, computers, electric cars, wind generators, solar cells and batteries. The future is bright!"



An Ultra good association

The Trust is thrilled to be partnering with specialist electrical and electronics engineering firm, Ultra Electronics Australia, to offer a \$10,000 scholarship for a third or fourth-year student in electronic engineering, computer science, systems engineering or applied physics. The scholarship encourages applications from indigenous students as well as from women wanting to enter STEM careers.

Ultra Electronics provides a wide range of solutions across a number of domains – including electronic warfare, ISR (intelligence surveillance and reconnaissance), tactical communications, and maritime and underwater warfare.

The successful applicant, **Harrison Bagley** from The University of Adelaide, will have the opportunity to undertake a work placement with the company, which has a global reach.



Developing community leaders

In association with the Leaders Institute of SA, the Trust is providing a series of \$5000 scholarships to help develop leadership skills in South Australian communities.

The first seven were awarded in the Upper Spencer Gulf region and a second tranche of up to eight will target people living and working in the northern suburbs of Adelaide.

The scholarships are aimed at people either working in not-for-profit associations or small businesses, or undertaking pivotal roles within the community.

The Leaders Institute is a not-for-profit association committed to fostering better leaders who can deliver a stronger, healthier and more prosperous South Australia.

It provides innovative, holistic leadership development programs that expand and enrich the capacity and performance of individuals and teams at all levels. Its flagship program, the Governor's Leadership Foundation is now in its 21st year.

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.

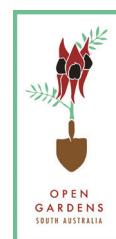
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If you're inspired by the students the Playford Trust supports, you might wish to consider a donation to add to the value and reach of our work.

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'.

Our Partners



CONTACT US Our Executive Officer can put you in touch with a Board member to discuss options for supporting the Trust's work. Contact us by calling (08) 8429 5220 or email: admin@playfordtrust.com.au.

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