



PROVIDING PRESTIGIOUS SCHOLARSHIPS FOR HIGH-ACHIEVING SOUTH AUSTRALIANS

2010 Awards Ceremony



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Photographs courtesy of Alan Pepper

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The Scholarship winners for 2010 were presented with their awards at a ceremony at Old Parliament House recently.

1. Playford Honours Scholarship Winners from left, Lilian Ellis-Gibbins, Natalya Schmerl, Tamsyne Smith-Harding, Evan Johnson, Niall Buggy, Paolo Sossi, Jason McLaren, Grant Neale, Kathryn Hill, and Leigh Thredgold with Playford Trust Chairman The Hon David Wotton. (not shown Christopher Coffey and Mark Aartsen)
2. Past Scholar Stephen Dutschke (third left) and Playford Trust Board Member Susie Herzberg (on right) congratulate new Regional Scholars (from left) Alana Cuthbert, Kazsandra Howell, Jacob Dawson and Timothy Symonds.
3. PhD Scholarship Winners from left, Caleb Loades, Rhys Murphy, Amy Macken and Emma Plant with past scholar Dr Kate Delaporte (second left) and Trust Board Member Professor Don Bursill AM (on right).
4. Honours Scholarship winner Natalya Schmerl with The Hon David Wotton
5. Mr Peter Pedler, left Chairman of the Scantech Board and Playford Trust Board member the Hon Dean Brown AO present Emma Langhans Playford Scantech Scholar with her Award. The other award recipient Benjamin Owen was unable to be present.
6. Honours Scholarship winner Christopher Coffey with The Hon David Wotton
7. PhD scholar Amy Macken with the Hon Lyn Breuer Speaker of the House of Assembly
8. Playford Trust Board Member Mr Keith Yates (left) and Mr David Brunt Chairman of AusIMM (Adel) with AusIMM/ Playford Scholarship winners Caitlin Rowett and Emma Westthorp.



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Chairman's Message



July saw another wonderful reception at Parliament House when we presented scholarships to twenty four students.

The Trust greatly appreciated the assistance provided by the Hon Lyn Breuer MP, Speaker of the

House of Assembly, who hosted the evening. We were also pleased to welcome Tom Kenyon, representing the Premier, and Isobel Redmond, the Leader of the Opposition. We particularly enjoyed the company of many of the students' families and friends.

The business sector was very well represented. Our industry partners, Scantech International and the SA Branch of the Australasian Institute of Mining & Metallurgy, assisted with the presentations, as did two previous scholarship recipients, Dr Kate Delaporte and Steve Dutschke. Three current scholars, Sarah Catalano, Rhys Murphy and Emma Westthorp, each provided us with an excellent presentation.

Encouraging comments have been made by students who would like to see a Playford Trust alumni established and we hope soon to be able to announce this, thus providing networking opportunities for both our past and current students.

We were all very sorry to learn that Ros Judson, the very efficient secretary to our Scholarship Committee, will be leaving us. Ros has provided much valuable support and built up a wonderful rapport with our students. We wish her well and much happiness as she enjoys retirement. Ms Robyn Shilcock has been appointed to this position and we look forward to working with her.

Finally, a very big thank you to our donors. If you are able to assist our students by making a tax deductible donation we would be very pleased to hear from you.

With my best wishes

The Hon David Wotton.

Key dates

Applicants for 2011 Playford tertiary scholarships are advised to apply by 28th January 2011. Details and application forms are available on our web site www.playfordtrust.com.au

News from scholars

regional

Alana Cuthbert

Regional Science and Engineering Scholarship
Mathematical Sciences
The University of Adelaide

The transition from high school to university, and from rural to city life, has been exciting and enjoyable. My first year in mathematical sciences has focused on mastering a foundation of mathematics, including differential and integral calculus with applications, differential equations, linear transformations and applications of linear algebra, and an introduction to statistics.

Recently I had the opportunity to attend a networking dinner, where I met representatives from the mathematics industry and was fascinated to learn that maths can be applied everywhere from financial modelling to cancer research. I am now eagerly looking forward to continuing my studies in mathematics and seeing where they can take me.



Tim Symonds

Regional Science and Engineering Scholarship
Aerospace Engineering
The University of Adelaide

After completing secondary studies at Victor Harbor High School last year, I am now in my second semester of a Bachelor of Aerospace Engineering at the University of Adelaide.

Whilst I have enjoyed the whole course to date, I have found this semester to be particularly interesting, because the subjects I am currently undertaking show me how engineers work, and to some extent how concepts are applied to solving real engineering problems.

So far, I am extremely happy with the course I have chosen and am thankful for the support to follow it provided by the Playford Memorial Trust.



Niall standing in front of the test rig

Niall Buggy

**Honours Scholarship
Advanced Manufacturing and Engineering
University of South Australia**

My honours research project, a water chilling system, is challenging. The aim of this research is to chill water using less than half the energy of conventional systems. This chilled water can be used to cool a building's air and/or equipment.

I have been involved in the construction of the prototype heat exchanger from the beginning and the heat exchanger unit itself is now complete. The next stage will be to install it in the test rig, with thermocouples and flow sensors attached followed by testing. Results from the tests will be compared to a theoretical model of the heat exchanger to see how well the prototype performs.

I have had a few hurdles to overcome. Getting access to tools and machines and sourcing specific materials were difficult but made much easier with excellent support from the technical staff within the school. I look forward to the testing to see the results from all our hard work.

Christopher Coffey

**Honours Scholarship
Agriculture, Food and Wine
The University of Adelaide – Waite Campus**

My honours project involves comparing the differences between grapes which have been grown conventionally, and those produced by organic and biodynamic systems. This has included managing a descriptive analysis panel to assess these differences, as well as analysing chemically the grapes' acids, sugars and minerals.

Since the Playford scholarship has relieved me of the need to support myself, I have been able to pursue some extra-curricular activities, such as writing for Adelaide Hills Magazine and attending extra workshops. In September I was lucky enough to be a steward at the weeklong Landmark Australia Tutorial, arguably the most prestigious wine event in the country, where I met greats such as James Halliday,

Huon Hooke and Andrew Caillard, along with many winemakers. I tasted amazing Aussie drops including a 1973 riesling, 1942 "Burgundy", 1928 Morris muscat (liquid gold the consistency of motor oil!) and a 1910 "Port". Such experience has forever enhanced my understanding of the wine industry.

The Playford trustees have my lifelong gratitude for their invaluable support.

Kathryn Hill

**Honours Scholarship
Water, Energy and Climate Change
The University of Adelaide**

Stomatal frequency and area was measured in four Myrtaceae species from South Australia. Where possible, these measurements were taken for each decade from around 1880 to the present using herbarium specimens. These measurements were plotted against atmospheric CO₂ concentrations across this period with the expectation that stomatal frequency or area would decrease with rising atmospheric CO₂ concentrations. This expectation is due to photosynthetic rates being shown to increase with increasing atmospheric CO₂ concentrations thus leading to the presence of more stomata. Other factors in carbohydrate production, such as water availability and temperature, cause plants to reduce their total stomatal area while still benefiting from the increased atmospheric CO₂ concentrations.

Some very interesting results have emerged from this study. *Callistemon rugulosus* showed a trend of increasing stomatal frequency but a significant decrease in stomatal pore area. Epidermal cell size is unlikely to have changed. *C. rugulosus* has compensated for the change in stomatal pore area by increasing the size of the cells flanking the guard cells.

These results are important for inferring past climates and predicting how these plants will respond to future climate changes.



Kathryn Hill



Natalya Schmerl and Lily Ellis-Gibblings



Jason McLaren

Lily Ellis-Gibblings

Honours Scholarship
Physics
Flinders University

Project Title: Dye Sensitized Solar Cells (DSC)

Research into alternative energy sources is highly important in a world so reliant on non-renewable energy. DSCs are a photovoltaic cell consisting of a light absorbing Ruthenium dye layer adsorbed to a mesoporous Titanium Dioxide nanoparticle layer – photons excite an electron in the dye which is immediately injected into the conduction band of the TiO₂. A liquid electrolyte completes the circuit by regenerating the dye cation.

My research has focussed primarily on the adsorbed dye layer present in the DSCs, where the adsorption of the dye has been studied via depth profiling to determine the adsorption isotherm. Depth profiling is achieved using Neutral Impact Collision Ion Scattering Spectroscopy, similar to Rutherford Backscattering, albeit at a lower energy which allows a much higher resolution.

It has been a great learning experience and a lot of fun!

Natalya Schmerl

Honours Scholarship
Physics
Flinders University

Project title: Interfacial Structure in Organic Photovoltaics

OPVs are a form of solar cell which utilise polymers to convert light into current and have several advantageous properties such as flexibility and transparency. However, the efficiencies of these cells are low compared to conventional silicon based cells. A method for improving this has been realised via the insertion of a thin (~6Å) alkali halide layer between the low work function electrode and photoactive layer, but the mechanisms acting behind this have not been identified and as such the cells are not optimized. My project is an empirical study aimed toward quantitatively investigating both the concentration depth profiles and electronic level structure at this interface and near area.

Neutral Impact Collision Ion Scattering Spectroscopy (NICISS) has been used to determine concentration

depth profiles (depth resolution 0.2nm) for the salts LiF, NaF and KF respectively on a spin coated P3HT:PCBM polymer layer.

I have found the 'Honours experience' to be highly rewarding personally whilst also providing promising scientific results.

Jason McLaren

Honours Scholarship
Information Technology, Engineering and Environment
University of South Australia

Capillary rise occurs all around us in nature and is responsible for such things as keeping trees alive (good) and salt damp (bad). Theory describing capillary rise dynamics is available for homogeneous (ideal) capillaries. Heterogeneous capillaries however have received less attention; hence predicting fluid flow within them is an interesting theoretical and practical challenge.

My honours research is concerned with how heterogeneous capillary walls may influence capillary rise dynamics, and is a part of the broad research area of wetting. Findings from this area of research may prove useful in bettering and creating new applications in areas such as the printing, mineral processing and micro-fluidic industries. I am currently working with glass capillaries of different radius and using different water-glycerol mixtures to study the rise dynamics.

I am enjoying this research and hope to continue next year. The pictures show me working in a clean room (low dust environment), setting up one of the capillary rise experiments. When conducting these experiments, one should never underestimate the importance of the proverb "cleanliness is next to godliness".

Grant Neale

Honours Scholarship
Computer Systems Engineering Centre
University of South Australia

My project aims to develop new techniques for analysing the performance of parallel manufacturing systems. Such systems are employed to manufacture computers, phones, cars, hand tools, and an almost endless list of other products one would expect to find in every Australian household.



Grant Neale



Tamsyne Smith-Harding



Paolo Sossi

The project contributes to a larger three year project currently being undertaken by the Computer Systems Engineering Centre at UniSA, which is funded by the Australian Research Council. A large part of the work involves developing mathematical models for parallel manufacturing systems and analysing those models to obtain accurate performance estimates for systems before they are built. This approach limits the risk of implementing large expensive systems, only to discover that they do not meet performance expectations.

I am currently in the process of analysing the results obtained throughout the year and writing a paper based on my project for publication. The project has been a significant challenge, but one that I have very much enjoyed. I thank the Playford Trust for their generous support.

Tamsyne Smith-Harding

**Honours Scholarship
Marine Biology
Flinders University**

My honours project this year has focused on investigating the impact of salinity on the nanostructure of diatom frustules. Diatoms are single-celled algae that exist in all aquatic environments. In the marine environment, diatoms are the most abundant photosynthetic organisms and it is estimated that their role in global carbon cycling is equal to that of all tropical rainforests! In addition, diatoms form the basis of short, energy-efficient food webs that support commercially important fish species. Diatoms are characterised by their ornate silica cell wall which provide mechanical protection. Each species has unique nanosized decorations on the frustule surface, which serve a range of functional roles including defence against viruses and bacteria and nutrient absorption. In addition, these nanofeatures have been found to adapt to environmental changes (including salinity changes).

I have participated in other projects in phytoplankton ecology including research cruises monitoring the biological and physical oceanography in – not all work, some fun and play catching delicious tuna!

Thank you to the Playford Trust for the financial assistance this year which has allowed me to focus on my honours work and field work opportunities.

Paolo Sossi

**Honours Scholarship
Mining and Resources
The University of Adelaide**

Doing honours at the University of Adelaide has afforded me the pleasure of working alongside some of the world's leading geoscientists. Such a privilege enabled me to conduct research while still an undergraduate, thereby kindling a passion for geochemistry. Unexpectedly, I was nominated for a Playford Trust Scholarship during my honours year, and at the ceremony I was particularly heartened to learn of the success that fellow scholars had achieved in their respective academic fields as well as in their community. I hope to emulate them in achieving a balance between life and study as I look forward to researching for my doctorate.

My work deals with the chemistry of igneous (e.g. volcanic) rocks - whether their elemental abundances, isotopic composition and physical characteristics can shed light on their sources, creating a clearer picture of the interior of the Earth. If rocks are windows into planetary interiors, then we look through their glass, darkly.

Leigh Thredgold

**Honours Scholarship
Physical Chemistry
Flinders University**

I am investigating an improved methodology for the extraction and analysis of propellant stabilisers and their derivatives.

Propellants have been intensively studied due to their instability and the catastrophic events that can arise from their degradation during prolonged storage. Stabilising compounds are added to propellants to prolong safe storage time, however as a propellant ages, the amount of stabiliser decreases and therefore all stored samples have a 'shelf-life' beyond which they become unstable. It is therefore of critical importance to be able to determine the amount of stabiliser remaining in propellants.

Current stabiliser extraction and analysis methodology employed to do this is lengthy and therefore costly. During the year I have been working towards developing new methods with significantly shorter

timeframes to allow more cost and time effective analysis. To date we have seen promising results in reducing the overall timeframes from 16 hours down to somewhere in the order of 30 minutes.

This research provides great promise for our collaborative partner Defence Science and Technology Organisation (DSTO) in allowing them to significantly increase the number of samples tested in a given time, and at a greatly reduced cost.

Emma Langhans

**Scantech/Playford Honours Scholarship
Physics**

The University of Adelaide

243 days in, 53 more to go! This year has really flown by. The first semester of Honours had a full load of course work on top of our individual projects. Adjusting to the heavier workload and the demands of undertaking research for the first time was a challenge.

My Honours project is on magnetic monopoles, a theoretical particle which is magnetically charged. Although there is no experimental evidence for their existence, there are reasons for believing monopoles may exist. One of the most compelling reasons is to do with electric charge quantisation, in which all particles carry a charge which is an integer multiple of the charge on a down quark. This well-documented phenomenon still has no satisfactory explanation, but is a natural consequence of the existence of monopoles. My project has mainly focused on the relativistic interaction of a charged spinless particle with a general spherically symmetric monopole.

At the moment, I'm up to the stage of writing up my project report, which is coming along quite nicely. I'm looking forward to completing a Diploma of Education next year to become a high school maths and science teacher.

Caitlin Rowett

**AusIMM/Playford Honours Scholarship
Minerals Geoscience
The University of Adelaide**

My honours project is based at the Challenger Gold Mine in north western South Australia and is titled Nature and Timing of the Brittle Structures at Challenger Gold Mine. The project has a structural geology focus looking at the fault sets observed in a systematic manner. I undertook detailed mapping of walls and backs of three underground levels at Challenger and from this I have produced a 3D model (using information from kinematics and displacement indicators). In addition I have also conducted thermochronology on lamprophyre samples which were processed at the Western Australian Argon Isotope facility. The dating of the faults will help to constrain a history of the Christie Domain the geological province that hosts the Challenger Mine.



Caitlin Rowett

This honours year has included field trips to New Zealand to observe diverse geological settings, to Perth to a course on structural geology in mining and exploration and to Arkaroola looking at mineral exploration undercover.

The photo shows me undertaking petrographic analysis of samples collected from along the joint sets at Challenger Gold Mine.

PhD Scholars

Caleb Loades

**PhD Scholarship
Advanced Manufacturing & New Technologies
University of South Australia**

The primary aim of my PhD research will be to broaden our understanding of the role of Carbon Nanotubes (CNTs) in enhancing the efficiency of solar cells, and potentially the design and construction of commercial solar cells with superior properties.

In the past few months, a great deal of work and negotiation have been undertaken including some joint practical experiments with the CSIRO (Sydney) and Melbourne University.

I have settled into the Mawson Institute at UniSA, have set up my laboratory, and improved my Chemical Vapor Deposition Reactor. Recently we have produced and used gold nanoparticles to produce Single Wall CNTs, which may have direct applications in improving the efficiency of photovoltaic solar cells.

My official project proposal and presentation deadlines are fast approaching, and drafts have been completed, with a tentative presentation date in the last week of October.

On a recreational front, one of my Rottweilers (Jake) won Best of Breed at the Adelaide Royal Show (Thanks to Michael and Christine).



Amy Macken



Rhys Murphy



Emma Plant

Amy Macken

**PhD Scholarship
Climate Change
Flinders University**

Over the last few months my project has really taken shape. I have defined specific research aims, conducted an extensive literature review and put in place my methodological framework. It's a good feeling. My primary aim is to document variation in small mammal community diversity and species abundance over the last 45,000 years in South-Eastern South Australia. Can trends or cycles in this variation be detected, and, if so, over what time-scales have they operated? Most importantly, for those species most at risk today and in the future from climate change, what has been the impact of past environmental and climatic disturbances?

I am now reviewing and cataloguing at least 30,000 small mammal fossil specimens that have previously been collected from the Naracoorte Caves World Heritage Area. They accumulated in the caves via owl predators. Roosting in the caves, owls regurgitated pellets containing the bones of their prey items. This represents a sample of the palaeocommunity, the basis for my project. The photo is taken in the palaeontology lab at Naracoorte, where I have been examining the small mammal fossils.

Rhys Murphy

**PhD Scholarship
Science and Engineering
Flinders University**

My PhD project is in synthetic organic and supramolecular chemistry, and centres on the development of novel multi-guest molecular tweezers. Molecular tweezers are artificial receptors, which contain cavities capable of binding smaller guest molecules via non-covalent forces. This interaction between the so called host (the tweezers) and guest can be measured using techniques such as UV-Visible spectroscopy and Nuclear Magnetic Resonance spectroscopy (pictured).

Most molecular tweezers bind one guest molecule at a time. Currently, we are developing systems that will accommodate multiple guests simultaneously in different cavities. We aim to demonstrate that the binding of a guest to its cavity within the tweezers is

under allosteric control. That is, binding at one site will regulate the size and shape of the guest to be bound at another site.

This will be useful in selectively sorting mixtures of molecules based on their relative size, shape, and stereochemistry. These properties are critical to the functioning of biological systems, and, as such, applications of our molecular tweezers may include (but are not limited to) mimicking enzymes, or developing sensors for specific drugs. Molecular tweezers also find applications as artificial photosynthetic systems.

I'm very much enjoying my PhD and looking forward to the years ahead. I'd like to take this opportunity to thank the Playford Memorial Trust for their generosity and support.

Emma Plant

**PhD Scholarship
Soil and Land Systems
The University of Adelaide – Waite Campus**

My PhD research is on "Comparison and Development of Advanced Techniques for Organic Matter Characterisation in Water and Wastewater".

Research into the characterisation of natural organic matter (NOM) from pulp and paper mills began with a sampling trip to the Kimberly-Clarke Australia mill and to Lake Bonney in the south east of South Australia. Water samples were collected at different stages of the pulp and paper-mill process, along with wastewater samples and sediment core samples from Lake Bonney. Samples will be analysed using various characterisation techniques that will allow for changes in NOM character to be determined through the mill wastewater treatment processes and on into Lake Bonney. NOM character in Lake Bonney sediment core profiles is also being evaluated to investigate the fate of specific NOM fractions in the lake.

This study will include the application of solid-state ¹³C NMR spectroscopy where techniques developed for soil organic matter characterisation will be adapted for NOM analysis. Other techniques to be used include high performance size exclusion chromatography and degradative-pyrolysis. With the development of improved tools for NOM characterisation, I will develop an understanding of NOM chemistry which, in turn, will facilitate the development of more sophisticated treatment options.

News from Alumni



Ornamental Eucalypt Development Programme

Playford Trust members were delighted to join our 3rd Horticultural Scholar Dr Kate Delaporte on 14 September 2010 in the celebrations marking the receipt of significant funding for the Eucalypt Development Program.

Horticulture Australia, in partnership with the University of Adelaide and three commercial nurseries, Humphris Nursery (Vic), Narromine Transplants (NSW) and Yuruga Nursery (Qld), have provided \$2 million in funding over 3 years for the Ornamental Eucalypt Development Program.



Professor Roger Leigh, Head of School of Agriculture, Food and Wine, Dr Kate Delaporte, University Research Fellow Ornamental Eucalypt Development Program, Professor James McWha, Vice Chancellor and President of University of Adelaide, Hon David Wotton, Chair Playford Memorial Trust.



The Laidlaw Family (Sonia Laidlaw, Hugo Twopenny, the Hon Diana Laidlaw), Dr Kate Delaporte and the Hon David Wotton.

Professor Roger Leigh, hosting the event, thanked members of the Playford Memorial Trust and the Laidlaw family for their support of scholars and the maintenance of the plantings over the last 15 years.



Our New Partner

The Playford Trust is delighted to announce a new partnership with Hillgrove Resources. Hillgrove is a listed Australian mining company (ASX: HGO)



focused on developing its Indonesian and Australian base and precious metals projects. The Company's flagship development is the Kanmantoo Copper Mines Project, located 55km from Adelaide.

Hillgrove reports that it strives to have local landowners and communities benefit from the company's presence. Hillgrove has established a tradition of supporting South Australian universities and their mining related courses through student project work. Hillgrove's Office Manager Lisa Saw reports.

"We are now very proud to extend our local sponsorships to another level by supporting the Playford Memorial Trust and its very important activities."



We are delighted with our revised website

www.playfordtrust.com.au

and the support received from Wallace Web Design.

Do take a look to keep informed of the Trust's activities and key dates for scholarship applications.

Please contact

The Playford Memorial Trust Inc
GPO Box 2343 Adelaide SA 5001
T: 08 8226 3627

E: admin@playfordtrust.com.au

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Playford Trust News

is published twice a year.

Editorial Team; Susie Herzberg, Ros Judson and Anna Cox.

Graphic Design by Stokes Creative

Letters from scholars or donors

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admin@playfordtrust.com.au

