While in South Australia, Dr Chai presented at six schools across in their classes. Fremont Elizabeth students were inspired to hear from a highly tertiary maritime engineering study and the mathematics and put a joke in every now and then so it wasn't too serious.

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**Blackwood looks to SAGE for inspiration**

Blackwood High School continues to look for ways to inspire its students into a career in electrotechnology.

Recently, Blackwood’s VET electrotechnology students visited SAGE Automation, Australia’s leading electrical controls system integration company. The visit gave the students a taste for what a career in the electrical control & automation industry will be like and also helped them identify various career paths in the industry.

SAGE Automation specialises in industrial automation and control systems. Its General Manager of Operations Paul Johnson says SAGE can offer a lot to the South Australian community and also the Blackwood High students.

“Our customers are in the defence, infrastructure, manufacturing, mining and utilities industries,” Paul said.

“We want to show the students of Blackwood High that our national company, with its great project delivery capability, manufacturing centre and training facilities, can provide for great career opportunities in electrotechnology.”

“The school is obviously doing a great job with these students as they all showed genuine interest in the industry and were confident to ask capable and intelligent questions.”

The trip to SAGE is one of many industry visits offered to Blackwood’s VET electrotechnology students for career inspiration.

For more information on SAGE Automation, visit www.gotosage.com/.

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**Where are they now?**

**An interview with Jarad Hearnden**

Meet Jarad Hearnden, a past student of St Patrick’s Technical College. Jarad graduated in 2013 and is now in his first year of an electrical engineering apprenticeship at ASC.

He is currently working on the build of two Air Warfare Destroyers, one of which will be put in the water later this year. Whilst at St Patrick’s he was appointed Trade Leader by his peers, which involved raising issues brought to him by class mates and representing his trade group at assemblies and giving reports.

**Why did you choose to study at St Patrick’s Technical College?**

I was at Golden Grove High School and was keen to learn more about engineering. I transferred to St Patrick’s because they offered a course in Applied Engineering, which, at the time, wasn’t yet available at Golden Grove.

**What was your favourite thing about studying at St Patrick’s?**

I really liked the practical work we got to do at St Pat’s. For two days a week, we were out of the classroom and doing more hands-on work. I also like that we got to do extra work experience there.

**Why did you choose the Applied Engineering course?**

I wanted to keep my options open for after high school. At the time, I wasn’t sure if I wanted to study engineering at university or do an apprenticeship in electrical engineering. My time at St Patrick’s helped me figure out that I prefer hands-on work so I decided on the apprenticeship.

**What drew you to ASC?**

When I was in Year 11, staff from ASC came to our school to talk about the industry and what they do. I thought it was really interesting but I wanted to finish Year 12 first. I put in an application on the first day they opened.

**What differences have you noticed between studying at high school and working at ASC?**

Working on an Air Warfare Destroyer is exciting. Everything is bigger and better. When I was at school, I didn’t recognise how important workplace safety is. But being here has really taught me how important it is.

At ASC, you get to work with different people on different areas of the ship. And you get a rostered day off too!

If you know of a previous student that you would like the Advanced Technology Project to reconnect with, contact Pam Gerrard at pam.gerrard@sa.gov.au.
A new direction for three SA schools

South Australia will soon have three more specialist public schools.

Following the success of Le Fevre High School’s conversion to the Maritime High School, the SA government has committed to enhancing the STEM capabilities of Seaview High School, Hamilton Secondary College and The Heights School.

Seaview High School is set to become a specialist Advanced Manufacturing school. A $2.3m Centre for Advanced Manufacturing will be developed with state-of-the-art facilities to compliment a specialised STEM-focused curriculum. Students will have the opportunity to experience futuristic technologies including digital animation and design, computer-aided design and modelling, laser and additive manufacturing, virtual engineering and robotics.

Hamilton Secondary College will become a specialist STEM school. Students will be provided with a contextualised curriculum that will draw on the various elements of STEM to solve problems such as designing and producing a robotic arm and locating and extracting rock samples from Mars.

It is anticipated that the enhancements to Seaview and Hamilton will prepare students for further education or employment at the new industry-inspired Tonsley precinct.

The Heights School will be transformed into a specialist defence school. Students will be offered a tailored curriculum that will focus on skills and capabilities that prepare them for careers in advanced technologies that are required in the South Australian defence industry. This program aims to prepare students for university study at a technical level with an emphasis on career pathways for future technology-related industries.

For more information on these schools, visit their websites.

Seaview High School  
www.seaviewhs.sa.edu.au

Hamilton Secondary College  
www.hamcoli.sa.edu.au

The Heights School  
www.theheights.sa.edu.au

Student learning reaches outer space

The Advanced Technology Project is taking student learning into outer space.

Students from Hamilton Secondary College, Fremont Elizabeth City High School and Hallett Cove School are using Launchbox to learn what it would be like to be a space engineer.

Created by a team of scientists and entrepreneurs, Launchbox is a program that teaches students about space engineering and science in a hands-on and safe environment. It requires students to create a mini satellite, called a Launchbox Kit, and launch it 30,000 metres into the stratosphere.

A Launchbox Kit consists of a cubed casing that is made by using a 3D printer. Students install a GoPro camera into the casing, which they use to take photos of their satellite’s stratospheric journey. They also equip the satellite with a GPS tracking system so they can find it after launch and return it safely to earth.

The Launchbox program is helping Advanced Technology schools expand their science curriculum in an innovative way. It is taking the concept of space engineering and turning it into an educational and rewarding student experience.

Students will be launching their satellites in September this year.

For more information on Launchbox, go to www.launchbox.net.au.

Defence industry pathways

South Australian students are learning about submarine design through the latest Defence Industry Pathway Program, known as DIPP5.

The DIPP program has been developed to provide students with futuristic skills and capabilities required in the highly skilled defence industries with a focus on skill sets that can be applied to all engineering and advanced manufacturing career pathways.

An initiative of TAFE SA and ASC, with funding from the Department of Further Education, Employment, Science and Technology, the DIPP5 teaches students to use specialised computer programs to design submarines and 3D printers to manufacture prototypes of them. The program gives the students 10 points towards their SACE accreditation.

DIPP5 is run out of the Advanced Manufacturing Centre in Regency TAFE, which houses some of Australia’s most advanced technology. This helps the students develop the necessary skills required in the defence industry and other engineering and manufacturing careers.

The program gives students an insight into what their careers could be.

“You’re not treated like a kid,” said one student.

“You’re treated like a young adult, which is great.”

Other students have commented on how DIPP5 have taught them how to produce orthogonal drawings, which is a skill they can utilise in the future.

For more information about DIPP5, contact Steve O’Connor at steve.oconnor@sa.gov.au
ATP visits MechExpo

In October 2013, over 160 Advanced Technology Program (ATP) teachers and students experienced MechExpo, a yearly showcase of projects by Adelaide University’s Mechanical Engineering honours students. Each exhibit is the culmination of a full year’s work from the students.

After viewing the exhibits, the teachers and students were treated to a presentation by Dr Cristian Birzer, one of the university’s Mechanical Engineering lecturers. Mr Birzer talked about the various tertiary study options available in engineering and how they could lead to an interesting career in the field.

The excursion aimed to get the ATP students thinking about a future in engineering. It also aimed to help them identify the skills and teamwork needed to complete an honours project that connects real-world engineering applications with the study of science and mathematics.

MechExpo 2013 saw more than 60 interactive projects on display. One of the projects was to design and build a maritime quadcopter. A quadcopter has unique flight capabilities such as surveillance, communications, rescue assistance, environmental studies and object tracking, which could be beneficial in maritime operations.

Another project was Helix, the cat-falling robot. Helix is a bio-inspired robot that mimics a cat in its self-righting. In other words, Helix will land on its feet when dropped upside down.

At the expo, the ATP students had to analyse and evaluate one of the projects. They interviewed the university students about their project and discussed their overall studies. The ATP students submitted their findings to the ATP team for assessment. Blackwood High School’s submission on the Robo Band project was the winner with honourable mention going to Henley High School’s submission on the Aerodynamic Characteristics of Australian Rules Football project.

In an enduring showcase of initiative, research and achievement, MechExpo celebrates its 20th anniversary in 2014. This year, the event will relocate to the Adelaide Convention Centre as part of Ingenuity 2014: An exhibition of engineering, computer and mathematical sciences.

Bringing together all teaching disciplines across the University of Adelaide’s Faculty of Engineering, Computer and Mathematical Sciences under the one event banner, Ingenuity 2014 will deliver a collective showcase of student projects, information displays and achievements for the first time.

The Advanced Technology Project will again be inviting students from our project schools to attend this event, view the broadened range of projects and interview the university students.

Ingenuity 2014 will be held at the Adelaide Convention Centre on Thursday 30 October 2014. Admission is free and open to the general public. To celebrate MechExpo’s 20th anniversary, you are invited to a special mechanical engineering preview event to be held the evening before on Wednesday 29 October. For more event information, visit www.ecms.adelaide.edu.au/ingenuity

SUBS in Schools for a deep challenge

South Australia is getting submarine-ready.

A select group of South Australian teachers is working with their interstate counterparts and Re-Engineering Australia (REA) to create a school-based program on submarine building.

SUBS in Schools will see students design and build a miniature version of Australia’s Future Submarine using a template model built by ASC. This is quite an enormous task as just one submarine consists of 3 million parts and state-of-the-art communications, defence and electronic systems.

The program is currently being piloted in selected schools* to ensure student learning outcomes align with the Australian Curriculum. Schools wishing to offer the program from 2015 are invited to register their interest to REA in August 2014.

It is anticipated that SUBS in Schools will help to equip South Australia with the right workforce to design and build Australia’s new fleet of submarines over the next 30 years.

For more information, contact REA at info@rea.org.au.

*The schools involved in the pilot of SUBS in Schools are Le Fevre High School (SA), St Peters Girls School (SA), Brighton Secondary College (SA), Noosa District High School (QLD), Engadine High School (NSW) and Kyabram College (VIC).
Chai opens the doors to engineering at Fremont

Students at Fremont Elizabeth City High School were recently treated to a presentation by Dr Shuhong Chai from the Australian Maritime College (AMC) in Launceston.

Dr Chai is Deputy Director of Students and Education at AMC’s National Centre for Maritime Engineering and Hydrodynamics, and is often at the forefront of cutting edge practices in her field.

Dr Chai spoke about the work students can expect to do in tertiary maritime engineering study and the mathematics and physics prerequisites for entry. She also spoke about the variety of scholarships on offer to those eligible and the different career options available after graduation.

Fremont’s female students were inspired to hear from a highly respected female engineer in an industry that is dominated by men.

“I didn’t think I was interested in boats and engineering at all, but some of the examples Dr Chai gave made it seem really interesting,” said one female student.

“It was very easy to understand. She made the information clear and put a joke in every now and then so it wasn’t too serious.”

After the presentation, Dr Chai led an activity that helped students identify the area of maritime study most suited to them. Many were surprised at the outcome and the variety of paths available.

“I had no idea there were so many things to study,” said one student.

“It ranges from a course in naval architecture to one that teaches you to be the person who drives the ship.”

Other students commented on how amazing it would be to sail on a ship or vessel that they had designed themselves.

The teachers also benefited from Dr Chai’s visit and noted the links between the presentation topics and what they are teaching in their classes.

While in South Australia, Dr Chai presented at six schools across the Northern and Western Adelaide regions.

Written by Karen McBride, ATP Manager, Fremont Elizabeth City High School

Student reflections of DIPP4

The Defence Industry Pathways Program (DIPP) is a 15 week SACE course designed to educate young people interested in advanced manufacturing and engineering. Our course ran every Tuesday in the second semester of 2013 at Regency TAFE and was taught by two teachers.

Our TAFE teacher was Anthony Tonkin and he taught us the practical side of the program and also showed us how to use all the instruments that we were unaware of. Our secondary teacher, Eddie Grzeskowiak, from Le Fevre High School was responsible for giving us the required theory work to gain our Stage 1 SACE credits.

At the start of the program, our task was to construct a CO2 powered plane model out of Balsa wood from our designs that would fly for 20 metres on a fixed line. For the designing part, we had to learn how to use the drawing boards and understand orthogonal drawings. This gave us the essential skills to design and draw our own plane models to scale with the appropriate views. We then constructed an aerodynamic plane using traditional tools.

We tested the planes and timed their speed. Eric’s plane was the fastest. It’s a great feeling when you finally complete something you’ve been working on for weeks and we all enjoyed making the planes and testing them.

The second part of the course was to build a CO2 powered jet from ABS plastic using a CAD program, called Autodesk Inventor Professional 2013, and then print it using a 3D printer. ABS plastic is a thermoplastic that fuses three different properties to give it strength, flex and resistance. Using the Inventor program made it easy to refine our previous model to improve its speed or make a new model.

The students who finished early could progress to the next stage, which was called Reverse Engineering. Reverse Engineering works exactly like it sounds; instead of designing complex objects on the Inventor program, we simply produced a digital scan of the object and the software enabled us to import the geometry into the CAD application.

We made lots of friends during the program and we really enjoyed it. Eric thinks it’s the best thing that’s happened to him all year, and for him it has been a career motivating experience. For Hieu, the most enjoyable part of the program was being able to tweak and fix his plane design using an application called Falcon (a virtual wind tunnel program). Rohit also had a great experience and his favourite part of the program was designing the plane using the Inventor program.

For all of us it was a great experience to learn and use new technologies to produce complex shapes.

Written by students Eric, Hieu and Rohit
Fremont Elizabeth City High School
Exciting projects at Hamilton

The Year 11 Physics students at Hamilton Secondary College have had the opportunity to be a part of some exciting and engaging Advanced Technology projects.

Launchbox
Launchbox introduces students to space engineering and satellites. It requires them to plan, build, launch and retrieve miniature satellites known as Launchbox Kits. The satellites are equipped with a navigation system and camera so students can take photos of their journey.

For more information on Launchbox, see the Student learning reaches outer space article on page 3 of this newsletter.

Unmanned aerial vehicle (UAV)
This project revolves around the physics of flight. Students learn how to perform projectile motion experiments and manoeuvre an unmanned aerial vehicle. The project culminates in a mock drop-off competition at the RAAF base in Edinburgh, which requires them to drop a ‘survival package’ to a specified area.

Drone Project
The SA Power Networks Drone Project requires students to design and build an unmanned craft and develop a detection and tracking system that can remotely identify faulty power cables and insulators in SA Power Networks power distribution network.

Students will program and fly a quadcopter, which is a helicopter that is lifted and propelled by four rotors. The students also learn how to use the quadcopter to take thermal images of a subject they wish to investigate.

This year, the students will use the quadcopters to take photographs of Hamilton’s vineyard and investigate its growth and water usage. They will also use them to monitor the watering needs of the school oval.

Concept2Creation run both the UAV and Drone projects, which are a part of their suite of programs; delivered and supported by NAMIG and their industry partners.

If you would like more information on Concept2Creation projects please contact Teresa Janowski on 8260 8903 or visit http://www.concept2creation.com.au

ATP & Royal Adelaide Show are going 3D

The Advanced Technology Project and the Royal Adelaide Show are collaborating to put on South Australia’s first 3D printing competition.

The competition is open to all South Australian secondary students in the categories of ‘Mechanical moving object’ and ‘Sculpture’, in both junior and senior groups.

The 3D entries will be showcased in the Advanced Technology Centre at the Adelaide Showgrounds for the duration of the 2014 Show. During this time, a panel of judges will assess each entry and decide the competition winners. Merit awards may also be presented at the panel’s discretion.

Entries will also be displayed for public viewing in the Department for Education and Child Development Gallery from 17 until 26 September.

Registrations for entries close on Friday 25 July 2014. Entries and their accompanying portfolio are to be delivered to the Showgrounds on 27 August 2014.

For more information, category design criteria and the full set of terms and conditions, visit www.theshow.com.au or contact Pam Gerrard at pam.gerrard@sa.gov.au.

Creating new STEM leaders

The Advanced Technology Project is committed to creating a new generation of STEM education leaders.

The STEM Education Leadership Program (SELP) has been set up to help current STEM educators progress their careers into a STEM leadership role. The program helps them develop their leadership skills and refine their knowledge in STEM curriculum to match the various needs of their schools.

So far, the current cohort of future leaders have attended four professional development sessions aimed at elevating their leadership profiles. Subject topics included managing up, understanding the use of data, knowing how to scope a relevant case study and understanding student perceptions and expectations of STEM sessions.

Future sessions will have an even greater focus on leadership and will include presentations from the principals of the Advanced Technology Project lead schools on STEM strategic planning and implementation.

The SELP will culminate with the participants undertaking a case study on a specific STEM activity within their school. The case study aims to support the development of STEM curriculum and other related activities at their school by deepening their understanding of STEM education.

For more information on SELP, contact Steve O’Connor at steve.oconnor@sa.gov.au.

Written by Brenton Evans, Advanced Technology Contractor