Program Update

The School Pathways Program, known in South Australia as the Advanced Technology Project (ATP), is a joint initiative of the Commonwealth and state governments that aims to increase the number of students studying STEM (science, technology, engineering and mathematics).

The ATP is funded by the Commonwealth Department of Defence and managed by the Department for Education and Child Development (DECD). There are currently 24 schools across the DECD, Catholic Education and Independent Schooling sectors that receive funding through the program.

We are pleased to announce a positive outcome of the review by the Centre for Defence Industry Capability (CDIC) and that all 3 Student Pathways Programs in SA, WA and NSW have been refunded for 3 years until June 2020.

We are proud that the excellent results achieved over the life of the project have been recognised and we will continue to advance this project, which has helped develop and support a positive STEM culture in South Australian schools.

EDITORS
Michael Scarman
Michael.Scarman@sa.gov.au
Mark Haughton
Mark.Haughton@sa.gov.au

In an Australian first, the International Space Station (ISS) has started preparations to host 3 school STEM experiments, giving SA government school students a unique opportunity to launch their experiments into space through the Neumann Space Facility for Australian Space Testing (FAST) program and Airbus Defence and Space.

The experiments will sit on the Bartolomeo platform outside the ISS, while high-tech sensors and receptors stream data back to the schools in South Australia for recording and analysis over 12 months in 2019, before being jettisoned to burn up in Earth’s atmosphere.

Applications with an experimental theme of ‘Innovation for a better future’ were available to all government primary and secondary schools, and experimental designs had to be strongly aligned with the Australian Curriculum and/or the senior South Australian Certificate of Education (SACE).

Fifteen schools initially sent in 24 experimental designs and after feedback from Neumann Space and DECD, 14 schools submitted 5-8 page portfolios, which were featured on the SA Schools Space Mission website.

The teams weren’t short of creativity in designing their space science investigation. From analysing magnetospheres using mobile phones to growing mushrooms in space, the experiments are a credit to the collaborative and creative approaches students and teachers are using within STEM learning.

Each of the 14 schools also showcased their experimental outlines at the 68th International Astronautical Congress in September to space industry experts, educators and local/federal government.

Representatives from Marryatville High School and Two Wells Primary School met the Minister for Defence Industry, the Honourable Christopher Pyne and the Australian Science Mathematics School received a vote from the South Australian Minister for Space, the Honourable Martin Hamilton-Smith.

Industry representative votes from the IAC and an expert panel from DECD, Neumann Space, Airbus Defence & Space, Adelaide University, Flinders University, UniSA, TAFESA, Department of State Development and space industry experts shortlisted 7 teams.

The shortlisted teams were Australian Science Mathematics School, Le Fevre High School, Mawson Lakes School, Norwood Morialta High School, The Heights School, The Pines School (R-7) and Two Wells Primary School, which will all continue to test and redesign their experiments. In 2018, 3 will be chosen to be launched.

The State Government is providing $80,000 to cover the cost of the project, which includes $50,000 for transportation of the science experiments and $30,000 towards associated student learning improvement.

Leadership of the SA Schools Space Mission, including the proposal, development and management of the project has been by Dr Sarah Baker (ATP Manager) and Rodney Mangos (DECD Executive Leader, Learning Improvement Division).
68th International Astronautical Congress in Adelaide

The 68th International Astronautical Congress (IAC) was held in Adelaide Convention Centre on 25-29 September 2017, with 31 government schools (10 of them ATP schools) supporting years 10, 11 and 12 students to volunteer.

Of the volunteering students, 45 of the 120 were from Advanced Technology Project (ATP) schools. After their morning of volunteering, students were able to attend any of the IAC sessions for the rest of the day.

Rob Shepherd, Principal of Le Fevre High School, was proud to be represented throughout the week at the IAC by year 11 student Deklan Soeroes as a participant.

"Deklan was also a DECD student volunteer on Thursday 28 September," said Rob. "Throughout the week he met world leaders in the space industry, heard outstanding keynote presentations and along with a group of Le Fevre High students and staff, he also met Dr Andy Thomas, an Adelaide-born NASA astronaut."

Le Fevre High School is one of South Australia’s ATP schools, running programs encouraging students to participate in various STEM programs including space projects. At the congress, Deklan met with a range of people from various companies including Surrey Satellites, Airbus Industries, DLR, JAXA and the Neumann Space authority.

"This allowed him to negotiate for sponsorship for the SPACE Mission project," said Rob, explaining that earlier in the year the school received an invitation to participate in the SA Space Mission project.

"I called for students to nominate themselves to a team to enter the competition to develop an experiment that can only be performed in space," he said.

A group of year 9 and year 11 students volunteered and set about developing an experiment. The students were Omar El Awad, Daniel Slater, Sebastian Roberts, Deklan Soeroes, Lachlan Landreth, James Finn and Rhys Kenny. Rob explained that the experiment was developed around the detection of ionized radiation that orbits Earth in the Van Allen Belts. These belts exist due to Earth’s magnetic field trapping highly energized protons and electrons from the Sun.

"Considering the experiment is to be mounted on the International Space Station, our team investigated how ionized radiation interacts with the station," he said. "We found that when the ISS passes over the South Atlantic, the intensity of ionized radiation greatly increases."

"We began designing an experiment to detect the ionized radiation and collect data on energy levels, direction of motion and speed of the ionized particles. Currently we are in communication with two employees at NASA who created a similar CubeSat mission to our own project," said Rob. "They will be helping us to design a detector capable of collecting the data. Our experiment must be a volume not exceeding 1 litre and weigh no more than 300g."

On the Thursday of the IAC week, the team from LeFevre presented their experiment to the delegates of the IAC. Rob said they received very positive and encouraging feedback from a diverse range of people.

"The students enjoyed the opportunity to meet with many distinguished people in the space industry and talk with them about our experiment and our aspirations."

LeFevre High School was recently shortlisted as 1 of 7 schools to receive a DECD grant to begin building their experimental prototypes across term 4 of 2017 and term 1 of 2018.

Inspiring Women in Defence Challenge

In April 2017, female high school students were challenged to test their problem-solving and teamwork skills in 2 defence-themed tasks in the state-of-the-art laboratories at Tonsley.

"Nine year 11 students from Aberfoyle Park High School participated in the challenge, held by Flinders University."

Jennifer Shinnick, Senior Science and Mathematics teacher from Aberfoyle Park High School said that in the first challenge, students explored concepts of cybersecurity and social engineering in relation to protecting sensitive information against cyberattacks. "They worked in teams to identify and analyse potential risks in the Tonsley facility," she said.

"In the second activity, students tried their hands at robotic engineering, working in teams to program Zumo robots to navigate an obstacle course representing a city ravaged by war."

Students navigate the 'city', avoiding dangers and providing aid to trapped civilians. "Our students showed persistence and creativity in their programming skills despite experiencing numerous setbacks along the way," Jennifer said.

"Our students acquitted themselves brilliantly, modelling our school values in the wider community," she said.
Woomeras, Ballistics and Replenishment at Sea – Indigenous cultural heritage and STEM

As part of a unit of work, year 12 Le Fevre High School students investigated human ingenuity, history, ethnology and cultural significance of propulsive technologies such as Aboriginal woomeras, South American atlatls and ancient European propulseur.

Woomeras, Ballistics and Replenishment at Sea focused on the mathematics and physics of motion and trajectory in 2 dimensions, as part of the physics syllabus.

They were shown 2 authentic woomeras and studied their technical attributes. Aboriginal guest speakers helped them to produce their own, either in conventional ways or with the use of a CNC laser cutter.

A woomera is a wooden spear-throwing device. Similar to an atlatl, it serves as an extension of the human arm, enabling a spear to travel at a greater speed and force than possible with only the arm. An atlatl is a wooden handle about 60 cm long, with a tip at the end, used to throw long darts (spears) with great accuracy and tremendous force. A propulseur is a propelling device.

Thierry Herman, ATP Manager at LeFevre High School said that at the completion of the course, students will take their woomera and provided spear to a secure area to test their propulseurs at different distances in a friendly competition.

Students are ready to blast off on a mission to Mars with the launch of the new Hamilton Space School facility at Hamilton Secondary College.

Education Minister Susan Close officially opened the Hamilton Space School on 28 September 2017, which coincided with the 68th International Astronautical Congress being held in Adelaide.

Industry professionals such as Andy Thomas, Pam Melroy and Andrea Boyd were in attendance to view the new Space School facility, which has 3 main areas created for its space science programs – a simulated Martian crater and landscape, a mission control room and a briefing room.

Peta Kourbelis, Principal of Hamilton Secondary College said that by capturing the imagination and enthusiasm of students, the school hopes to foster their love for STEM through the new Space School and inspire them in their learning.

“Our teachers are committed to delivering world-class curriculum and learning experiences to our students, developing their passion to become the STEM leaders of tomorrow and pursue STEM higher education pathways,” she said.

The simulated space environment provides students with an immersive experience where they are encouraged to think outside of the (classroom) box.

Designed to provide a unique extra-terrestrial learning experience, students will role play space scenarios with teams, taking turns to operate as astronauts collecting samples on the Mars surface, and scientists monitoring data and problem solving in the mission control room.

“The facility’s Martian landscape was designed to mimic a crater on Mars,” said Tony Virgo, ATP Manager at Hamilton. “The simulated Mars surface was built from rocks collected from all over Australia to map out 7 different geological areas within the crater. The design simulates real-life Martian explorations in the same way that NASA sends space probes to land in craters, as they are prime locations to gather samples.”

Hamilton Secondary College continues to forge relationships with leading organisations in the aerospace field, including NASA and the European Space Agency. Each year, the college hosts visiting astronauts from these organisations, inspiring students with their experiences and expertise in space exploration.

“Students will directly benefit from our relationships with the international aeronautical industry, deepening their STEM knowledge within a global context and learning from world experts in the field,” said Tony.
Winner of the STEM Educator of the Year

Congratulations to Thierry Herman from Le Fevre High School who has won the 2017 STEM Educator of the Year – School Teaching in the Department of State Development, SA Science Excellence Awards.

The awards showcase the critical importance of science and research to the development of industry and society as a whole. The Science Excellence awards are the most prestigious of their kind in the state and complement the national Prime Minister’s Prizes for Science.

Thierry is a well-deserved recipient of this award, as both a STEM teacher and current ATP Manager for Le Fevre High School. He has been a standout performer in both roles and as a mentor for other teachers.

Thierry participated in the ATP Work Placement program at ASC Shipbuilding Pty Ltd where he produced 8 units of products as an engineer. This role launched his career and taught him many new skills.

Thierry invested his time volunteering her time at events and competitions. From 2010 he volunteered for the Subs in Schools program, industry, working with ASC Shipbuilding Pty Ltd for the Subs in Schools program, the Defence Industry Pathways program (based at Regency TAFE) and Stage 1 Placement program at ASC Shipbuilding Ltd.

Thierry has been an innovative leader and developer of technology for STEM classes at Le Fevre High School, regularly using CAD, 3D printing and laser cut materials within his Naval Engineering, REA Subs in Schools and Primary School linkage programs.

He has helped students from years 8 to 12 to engage with and fully understand high-level mathematical and scientific concepts via a ‘hands-on’ approach such as boat building/testing, weathervanes, gyroscopic technology and cross curriculum trebuchet competitions.

Thierry often links his classes with industry, working with ASC Shipbuilding Ltd for the Subs in Schools program, Defence Industry Pathways program (based at Regency TAFE) and Stage 1 and 2 Naval Engineering Submarine Technologies.

The subjects engage students, who may not have previously continued with senior maths and science subjects, to increase their STEM skills.

Thierry invests extensively in learning new technological skills for his teaching and any student who has been in Thierry’s class speaks of his energy and passion for teaching, inspiring students to follow a STEM career pathway.

A recent year 12 graduate now enrolled in a Bachelor of Engineering (Naval Architecture) credits Thierry’s class as one that challenged and taught him many new skills and processes whilst building a real ship (1:145 scale AWD remote-controlled model) and emboldened him to apply for his accepted course.

Recently Thierry has been working on a woomera project for Aboriginal SSASTA students based on the mathematics and physics of the Aboriginal woomera ‘throwing guides’. This encourages Aboriginal learners to connect their culture and history with high-level mathematics and physics. DECD staff are currently working with Thierry and Aboriginal Elders on the APY Lands to maximise the spread of this program to rural schools.

Thierry also received his ‘advanced skills teacher’ classification (AST2) which is the highest teaching level a DECD teacher can reach, recognising and acknowledging exemplary teachers who can take their skills, understanding and practice and use it to influence the practice of their colleagues.

Watch Thierry talking about his teaching in our ‘Social Media @ ATP’ section of the newsletter.

New ATP industry broker joins the team

June 2017 saw the retirement of Pam Gerrard from the role of Advanced Technology Program Industry Broker after 5 years of dedicated service. Pam is now enjoying her spare time doing some travelling, both locally and overseas, as well as volunteering her time at events such as the 68th International Astronautical Congress recently held in Adelaide.

In September, Michael Scarman joined the ATP team as the new industry broker. Michael has worked in DECD for 7 years and has previously held positions as Business Partnership Manager, Curriculum Manager and Apprenticeship Broker.

“In each of these roles I’ve developed effective relationships with schools and industry, along with vocational education and higher education providers,” said Michael.

Before joining DECD, Michael worked in the private sector holding senior management positions in various employment and training organisations in South Australia.

“This industry background, combined with my work with schools, has helped me to make industry connections for schools that can be linked to STEM curriculum.”

“I’m looking forward to connecting with the many stakeholders involved with the ATP,” said Michael.

If you’d like to discuss developing partnerships between industry and schools, please make contact by email michael.scarman@sa.gov.au or phone 0488 045 325.
Brighton Secondary School wins second place in F1 in Schools World Finals

Five-time winners, Brighton Secondary School, achieved second place in the prestigious September world titles of the international F1 in Schools program, run by Re-Engineering Australia (REA) Foundation. The school already had an impressive track record and this year also received awards for Best Pit Display and Best International Collaboration.

Following a major win in the 2017 F1 in Schools Australian national finals, Brighton Secondary School’s team was eligible to compete within an international collaboration. They joined forces with German secondary school Fichte-Gymnasium Hagen to collaborate together on their entry in the 2017 F1 in Schools world finals.

The F1 in Schools Technology challenge is a holistic action learning program that focuses on developing STEM and long-term employability skills. The challenge involves more than 9 million students from about 17,000 schools in 31 nations. Students design, test and make miniature F1 cars capable of speeds of over 80 kilometres per hour.

Brighton Secondary School teacher, Finn Galindo knows all about the drive and competitive edge that fuels his students working on the F1 in Schools program. He’s run the full circuit – first as a Brighton Secondary School student competing in the F1 in Schools challenge, and now as a teacher and mentor.

“My dad is an electrical engineer, so I developed an early interest in engineering and computers. As a student I worked with Brighton’s F1 team as a design engineer,” said Finn.

The 2017 F1 in Schools STEM Challenge World Finals were held in Kuala Lumpur in Malaysia from 24 to 27 September. In 2016 the school collaborated with St Bedes in Melbourne to win second place overall in the world finals, as well as setting a new world record of 0.916 seconds with their entry.

The 2017 international team, Aurora, included Brighton students James Gurney, Uri Hauben, Dylan Rankine and Luke Battjes. The Australian students contributed to the design of the F1 car, focusing on refining the centre of mass in the model and developing an innovative glue-less and modular wheel system.

The incredible prizes on offer at the world finals create many experiences of a lifetime for young people. The winning team earns the title of world champions and are awarded scholarships to the City University of London.

“The F1 competition is so much more than engineering though, it brings so many STEM disciplines together. I learnt a lot as a student and knew I wanted to pass on this knowledge and mentor others. Coming back to Brighton Secondary School in 2016 as a teacher working with our dedicated team on this life-changing program is so satisfying.”

The incredible prizes on offer at the world finals create many experiences of a lifetime for young people. The winning team earns the title of world champions and are awarded scholarships to the City University of London.

The F1 in Schools program has an impressive array of sponsors offering many exciting opportunities such as 1 of 10 annual places in the Randstad Williams Engineering Academy. If accepted into this renown academy, the lucky student will have the opportunity to be mentored by engineers of real F1 teams, and perhaps win an internship with Williams.

“The students pushed themselves to the limit and are thrilled with the result,” said Finn.
STEM Week 2017 – Hallett Cove School

STEM week 2017 – held 7 to 11 August – was a huge success at Hallett Cove School, with a distinct buzz of excitement across all age groups.

Deputy Principal, Kersten Stengel said that students were really engaged in their learning across a wide range of projects and innovative ideas.

New graduates of Defence Industry Pathways program (DIPP)

At the beginning of 2017, Portside Christian College became a new Advanced Technology School and now its first graduates have just completed the DIPP.

“Becoming an ATP school enabled us to seek funding to support project initiatives in science, technology, engineering and mathematics (STEM) and access the highly competitive DIPP,” said Dr Adam Davis, Deputy Principal (Secondary) & SACE Coordinator at Portside Christian College.

Students from secondary schools across the state were invited to apply for 14 student places in the semester 1, 2017 DIPP. “Two of our students, Blake Slater and Kirsty Haynes were successful! Over a 19-week period they attended TAFE SA Advanced Technology Centre, Regency Campus every Tuesday while also juggling a normal Year 10 subject load,” said Adam.

“On Tuesday 4 July, I attended their graduation. Along with their parents, I was very proud of their achievements, the way they conducted themselves and the maturity they showed. Their enthusiasm for what they had learned and achieved was obvious as they explained to me the multiple stages of their designs using 3D computer-aided design software, problem-solving and teamwork skills, before progressing to the final 3D printing of a real model. I was rather envious they got to keep them!”

Adam said that it was an experience he’d like to see all students enjoy. “I’d like to thank Vanessa Dolphin (Careers & VET Coordinator) for supporting these students during their application process and throughout as well as the ATP and TAFE SA for giving the students this wonderful opportunity.”

Here is an abridged speech given by Anet Varghese, a year 11 DIPP student from Nazareth Catholic College:

“I stand before you all to share my experience of the Defence Industry Pathways Program. This course has been an amazing experience from day 1, the trip to see the air warfare destroyers at ASC. I have also enjoyed building my own air warfare destroyer and submarine. At the beginning, I had no idea how to use Autodesk Inventor professional software! I didn’t know where to begin, what to do or how to do anything, now looking at where I am, I have come a long way. I was thrilled to be accepted into the course. On the first day I was quite nervous as I didn’t know a single person in the room. Fast forward a semester and my class mates have made the course memorable and enjoyable. Each of them has made an impact on me. I will never forget this experience that has helped me to grow and develop the skills I have today.

On another note, this course has opened many avenues for me. I have always been interested in software engineering. As a result of this course, I was accepted for work experience at Microsoft during the September/October holidays.

Thank you to everyone for making the Defence Industry Pathways Program possible.”

“There were so many great designs and several of them were actually taken away by the RSPCA for the animals to use! The coding group worked on a huge robot called Roberto and many other smaller projects such as a maths ‘app’,” said Kersten.

On the final day of STEM week, Hallett Cove School held a presentation day with several VIP guests in attendance such as the Premier Jay Weatherill, the federal Education Minister Simon Birmingham, the South Australian Education Minister Susan Close, federal MP Amanda Rishworth, local MP David Spiers, and the chair of governing council, Grant Roach.

“Premier Weatherill was a very good sport and took part in a sprint race to test the timing devices designed and made by our students,” said Kersten.

Senator Simon Birmingham published a media release on his web site that said, “Hallett Cove is a leader in promoting STEM education and should be proud of the achievements of their students and teachers.”
Earlier in 2017, a group of 5 female scientists, engineers and university students from across academia, government and the defence industry travelled to Keith Area School to present a STEM workshop for girls and to train teachers about how best to deliver training on programming robots.

On 4 July, the group of experts delivered the professional development workshop and the next day, they led girls from years 6, 7, 8 and 9 in a STEM session.

Pina Stoks, Senior Research Scientist at DST Group Edinburgh said the girls’ workshop included inspiring talks by the visiting engineers about their career journeys, awareness of the latest technologies, and their applications of 3D printing and laser cutting. The students also conducted hands-on experiments and learned to program robots.

The aims of the workshop were to:
- raise awareness of STEM occupations and potential employers of STEM occupations amongst rural high school students (especially girls)
- encourage girls to consider studying STEM subjects in their final years of school so that they meet the prerequisites for STEM courses at university
- provide an opportunity for rural high school girls to meet female role models in STEM
- address the significant under-representation of girls from rural areas in university STEM programs
- demonstrate to girls that doing STEM is fun and achievable.

The workshop’s age group (11 to 15) also provided the experts with the opportunity to inspire girls with an aptitude and interest in STEM before they choose their subjects for years 11 and 12.

This is likely to influence subject selection in favour of girls choosing to study science and maths subjects leading to STEM undergraduate courses at university, and STEM careers.

“Both students and teachers gave very positive feedback about the workshops,” explained Ms Stoks, “It shows that there is a real need for this type of workshop in all South Australian schools.”

The visit was supported and sponsored by DECD’s Advanced Technology Project, with support from IEEE Region 10 Women in Engineering, DST Group, Flinders University, Adelaide University and BAE Systems.
3D printing on show

The 3D Printing Competition was held again in 2017 and entries were on display at the Royal Adelaide Show.

The Advanced Technology project, in collaboration with the Royal Adelaide Show, runs the competition, which includes all secondary schools in South Australia, not just ATP and/or government schools.

Entries were displayed in the Advanced Technology Pavilion along with the F1 in Schools competition.

To coincide with Adelaide hosting the 68th International Astronautical Congress, a new category was introduced for 2017 called Space+.

The standard of entries was excellent and included a jet turbine, TARDIS and international space station.

Social Media @ ATP

With many of our ATP schools and industry partners publishing social media and video links to showcase their innovative STEM curriculum and projects we want to keep you up to date with what is currently trending. Use the ATP QR code to easily access our Moodle site and electronic newsletters.

This month we are featuring;

- Listen to 5AA radio host Alan Hickey discuss the skills needed by students for future jobs in an interview with Susan Cameron (Executive Director, Learning Improvement - DECD), Thierry Herman (Manager ATP - Le Fevre High School), Eddie Grzeskowiak (Maritime Program Leader – Le Fevre High School) and student Deklan Soeroes (Le Fevre High School)
  
  https://www.youtube.com/watch?v=0D5L-Y3XU20

- Watch Thierry Herman from Le Fevre High School talk about teaching that saw him win the 2017 STEM Educator of the Year – School Teaching in the Department of State Development, SA Science Excellence Awards
  
  https://www.youtube.com/watch?v=wM47NmbGcmI

To find out which schools have been short listed for the SA Schools Space Mission, and to read more about each of their experiments, visit the website


Watch students participate in a Mission to Mars as part of the official opening of the Space School at Hamilton Secondary College

https://www.youtube.com/watch?v=p-ucqbiMRRE&feature=youtu.be

Winners

**Sculpture – Years 8 & 9**
1st Prize: Cameron Spray - Hallett Cove School
2nd Prize: Lilli Bishop - Mitcham Girls School
3rd Prize: Amy Thomas - Seaview High School

**Sculpture – Years 10, 11 & 12**
1st Prize: Dylin Bown - Pedare Christian College
2nd Prize: Scott Frost - Pedare Christian College
3rd Prize: Joel Arnold - Pedare Christian College

**Functional Object – Years 8 & 9**
1st Prize: Oakly Andry - Prescott College Southern
2nd Prize: Lilli Bishop - Mitcham Girls School
3rd Prize: Sam Jones - Seaview High School

**Functional Object – Years 10, 11 & 12**
1st Prize: Finn Holland
2nd Prize: Jay Danilic
3rd Prize: Dylan Andary

All three winners from Pembroke School.

**Mechanical Moving Object – Years 8 & 9**
1st Prize: Iona McClements - Hallett Cove School
2nd Prize: Ashley Dare - Seaview High School
3rd Prize: Julian Tuck - Seaview High School

**Mechanical Moving Object – Years 10, 11 & 12**
1st Prize: Harry Rischmiller - Pedare Christian College
2nd Prize: Matthew Prettinger - Pedare Christian College
3rd Prize: Ryland Kungel - Nuriootpa High School

**Space+ – Years 8 & 9**
1st Prize: Samuel Croft - Prescott College Southern
2nd Prize: Dylan Saubrey - Seaview High School

**Space+ – Years 10, 11 & 12**
1st Prize: Cameron Langfield - Pedare Christian College

The ATP and Royal Adelaide Show are excited about the 2018 student entries!

For details contact Michael Scarman at michael.scarman@sa.gov.au