

# STEM X Academy links teachers and scientists

*ET Staff*



*Rosemary Anderson from Tasmania, Jelena Edhouse from Queensland and Peter Turnbull from South Australia are watching a PDMS droplet lens forming in a 3D printed mould, specifically designed to create lenses for smartphones*

**T**eaching STEM subjects to students has received a lot of support and attention of late but missing from the equation has been the provision of ongoing professional development for teachers working in the area.

That's doubly true for teachers in rural and remote Australia. The consensus seems to be teaching STEM subjects has never been more important but despite that the further away you are from the capitals the paucity of professional resources becomes more acute.

The Australian Science Teachers Association (ASTA), which has a history of offering pertinent professional development to members of the science teaching community, has gone some way towards dealing with the lack of PD around STEM.

ASTA's oversubscribed STEM X Academy,



*Cathy Wilson from Queensland conducting an experiment to demonstrate atmospheric pressure*

held over five days in Canberra in partnership with Questacon – The National Science and Technology Centre, during the school holidays was an indication of the high demand for PD with regards to STEM. There were in excess of 250 applications for the 50 places available in the course held in January.

The event sought to open up the lines of communication between teachers and scientists at the coalface of research toward enriching their teaching and enhancing their students' involvement with the curriculum. The 50 teachers attending were able to pick the brains of 10 of our leading scientists with an eye on the collaborative production of fit for purpose resources.

ASTA made 11 scholarships available to teachers from remote areas towards covering the costs of attending STEM X Academy.



“One teacher from Normanton (Far North Queensland) told me that she was about 560 km from any valuable professional development. It has to be said that shortfall places rural and remote teachers and students at a disadvantage with regard to teaching STEM,” said ASTA’s CEO Vic Dobos who was instrumental in creating the academy and acted as a facilitator during the event.

ASTA focussed on selecting teachers based on merit and took into account teacher background, location and jurisdiction. The successful teachers included those in their first years of teaching right through to senior teachers with decades of experience behind them.

Dobos says that the format was strategic in that ASTA is hoping that the teachers would form an alumni of sorts, continue their conversations about what they garnered from attending the academy and disseminate their learning into their wider networks.

Whether shared informally or through web portals and technology, what was uncovered at the STEM X Academy should continue to have a life, long after the course’s conclusion.

“The academy provided a forum for teachers and scientists to sit together and develop resources that will enrich the teaching of science in schools. There is nothing that is more enriching than relevant, cutting edge science.

“Many of the conversations centred on what was happening in science and how that would be translatable to the student. We’re hoping that those conversations will continue and the resources that were developed will be shared widely,” Dobos said.

From the researchers’ point of view it was an opportunity to share their work with the wider public and find ways of expressing their findings, which Dobos says was a ‘win win’ proposition for everyone attending.

The type of discussions that took place between teachers and scientists were typically high level, with teachers being exposed to research areas like translational photosynthesis, concerned with producing food crops that are better able to handle climate change, ensuring the world doesn’t slip further in to food deficit.

Jared Wilkins the National Programs Manager at Questacon and a former science teacher says that the program intended for teachers to be able to explore the issues at hand and come up with ways of incorporating the research into their teaching.

The work around translational photosynthesis was outstanding with teachers creating a novel, inexpensive way of exploring the science.

“We were conscious that teachers were cautious about failure so we encouraged an atmosphere where it was alright to try something and perhaps fail.

“The teachers were given scientific papers and a procedure with which to dissect them and translate information presented into formats that could be used in the classroom. In the case

*Rachael Lehr from Western Australia develops a droplet lens for use on an iPhone*



*Tammy Moroney from Western Australia and Tamara Gallagher from remote Queensland enjoyed looking through microscopes*





*Amy Dyke from Victoria and Matt Titmanis from Western Australia demonstrate their group's response to the egg bungy jump activity*



*STEM X teachers on field trip to Parliament House*



*Julia Cullen and Sarah Chapman from Queensland offer a different response to the egg bungy jump activity*

of translational photosynthesis the teachers attending STEM X came up with an inexpensive but powerful way of teaching the science.

"Most will be aware that plants require a certain type of light to thrive. Using single colour LED lights and Milo tins the teachers were able to come up with an experiment that demonstrated difference in growth depending on the LED colour," Wilkins said.

Other areas explored included the advances made in camouflage, which is reaching scarily advanced levels, microfossils and quantum physics.

"Teachers attending were able to push their own limits and engage with the research areas to whichever degree they felt most comfortable with, whether they were younger teachers just starting in the profession or senior physics teachers with an advanced knowledge of a particular topic," Dobos said.

A few weeks out from the course's completion there is already evidence that the academy's stated goals are being met. A Facebook page for the teachers was set up which has enabled those

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attending STEM X to communicate and there is already evidence that the resources produced are finding their way into the broader science teaching community.

"We have one teacher who has already been asked to present his findings to other science teachers in his network and is in the process of presenting those resources to a wider community of school principals, and this just a few weeks out from the end of the academy," Wilkins said.

The STEM X Academy drew inspiration from the San Francisco based Exploratorium's three-week summer institute, recast around the Australian setting. The Exploratorium was the

brainchild of Frank Oppenheimer who worked alongside his brother J Robert Oppenheimer on the Manhattan project.

As well as collaborating on resource production, teachers attending STEM X Academy undertook field trips to research organisations including Geoscience Australia, Mount Stromio Observatory, CSIRO Discovery Centre and the Australian Institute of Sport.

In attendance at STEM X were Ken Silburn and Sarah Chapman, recipients of the Prime Minister's Excellence in Science Teaching in Schools in 2015 and 2013 respectively.

Silburn was instrumental in transforming students' perceptions about science at Casula High School in Sydney's west. Two-thirds of Year 11 and 12 students at the school now choose science subjects and are performing well above the state average.

Chapman has had a revolutionary effect on science teaching at Townsville State High School, bringing the subject alive with innovative teaching methods and inspiring more than one student to continue with science at the tertiary level.

Questacon has several STEM based programs, the main two being the Shell Questacon Science Circus which is aimed at younger students and the Questacon Smart Skills Initiative, both have a strong teaching support component.

"Around two years ago we were getting feedback from teachers as to how they could develop things to do in the classroom. They also felt that there was very limited opportunity to speak to other teachers in the area and create links with other teachers. It was from there that we began to formulate the plans for a residential program which has now become STEM X Academy."

"There are a number of teacher professional learning programs available through the Ian Potter Foundation Technology Learning Centre. Generally we try to steer away from approaching science, technology, engineering and mathematics separately. Instead we want teachers to explore the links between STEM subjects," Wilkins says.

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