



Nuclear-based science benefiting all Australians

Supplementary Submission to the Standing Committee on Employment, Education and Training

Inquiry into Innovation and Creativity: Workforce for the New Economy

Contents

1. Introduction.....	2
2. Industry – Education – Research Engagement Case Study: Yellowtail Kingfish.....	2
3. Career Pathways Model for Researchers	3

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1. Introduction

This submission is intended to supplement evidence provided by ANSTO in its original submission to the Inquiry and at the hearing on 1 March 2017.

2. Industry – Education – Research Engagement Case Study: Yellowtail Kingfish (Hansard page 3, Mrs SUDMALIS)

ANSTO plays a key role in connecting industry, education and research through access to world class instruments, the provision of student supervision, and as a facilitator for collaborative research projects. Establishing partnerships across industry, education and research is important in creating workforce-ready graduates, and ANSTO plays an integral role in supporting these interactions.

An example of this is the collaboration between ANSTO and UNSW on an aquaculture study in Papua New Guinea (PNG), the outcome of which led to the creation of new projects that further strengthened the links between industry, research and education partners. This in turn established a pathway for Australian university graduates to become workforce-ready, generating beneficial outcomes for industry in an emerging field of study and commercialisation.

Since 2015, ANSTO has been using its isotopic tracing techniques to improve aquaculture management strategies in PNG to improve food security and nutrition, and to create sustainable farming practices. This work is carried out in collaboration with the Australian Centre for International Agricultural Research (ACIAR), the University of New South Wales (UNSW) and the National Fisheries Authority, Papua New Guinea. ANSTO researchers worked closely with a UNSW student on this project.

The work done in PNG prompted UNSW and the NSW Department of Primary Industries (DPI) to capitalise on an opportunity to apply isotopic techniques to Pacific oyster production research. As a result, a second aquaculture project was created, involving a UNSW Honours student supervised by ANSTO.

The farming of Pacific oysters contributes approximately \$50 million per annum to the Australian economy, and significantly more globally. The isotopic composition of oysters is closely linked with their diet, and analysis has revealed specific species of microalgae which induce the best growth and survival of Pacific oyster larvae. This study is believed to be one of the first of its kind, and demonstrates the effectiveness of links between ANSTO, industry and research students. It was also critical in highlighting the potential uses of nuclear techniques in aquaculture and environment to the NSW Department of Primary Industries, and paved the way for further industry involvement for UNSW and ANSTO in the emerging field of aquaculture.

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As a result of the experience the UNSW Honours candidate received from the Pacific oyster project, the NSW DPI sponsored further collaboration with ANSTO and UNSW by offering the student a PhD project investigating the farming of yellowtail kingfish.

Globally, aquaculture is considered one of the fastest-growing food production sectors, with expectations that by 2021 more than half of the global fish market will be produced through aquaculture. Yellowtail kingfish farming has been identified as the one of the biggest opportunities for development in this sector.

The yellowtail kingfish research project has received funding from the Commonwealth Department of Agriculture and Water Resources and is being led by the Fisheries Research and Development Corporation (FRDC) in collaboration with NSW DPI, the South Australian Research Development Institute (SARDI) and the Australian Centre for Applied Aquaculture Research. It is expected to improve sustainable aquaculture practices while growing the Australian yellowtail kingfish industry as a whole. In participating, the UNSW PhD student will receive greater industry exposure and achieve a number of professional development outcomes. It will also allow the student to become a leader in the emerging field of aquaculture research in Australia.

This example demonstrates the capacity ANSTO has to act as a facilitator for the development and growth of students to ensure they are industry-relevant and workforce-ready. Collaboration with ANSTO has thereby paved the way for a PhD student to establish strong industry experience and gain key professional development and research skills to emerge as a leading researcher in a growing field that will have a positive impact on the Australian and international economies.

It should be noted that the PNG aquaculture project is not led by the International Atomic Energy Agency (IAEA), as was mistakenly advised in ANSTO's evidence to the Committee in the hearing of 1 March 2017. Rather, ANSTO and its collaborators are seeking to initiate a separate IAEA technical cooperation project on coastal vulnerability, to assist regional countries, including PNG and Australia, in mitigating against the socioeconomic and environmental impacts of sea level rise.

3. Career Pathways Model for Researchers (Hansard Page 4, Mrs SUDMALIS)

ANSTO is currently developing a career pathways model for its researchers that better reflects the multi-dimensional skill-sets and competencies required of a contemporary researcher working in a modern STEM-based research organisation.

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The model will provide increased transparency in available career pathways, and diverse career development opportunities to ANSTO staff.

Key performance indicators for career advancement for those working in research have traditionally focussed on academic outputs, including peer-reviewed publications and citation rates. ANSTO's new career model will recognise and reward not just these important academic measures of knowledge creation and research excellence, but also the many other equally important skills and competencies that underpin ANSTO's ability to deliver outcomes that fulfil a broad range of strategic objectives. The skills and competencies that will be recognised and rewarded include the translation of new scientific knowledge into usable applications, products and services that benefit people, industry and the economy, and outreach activities that will help attract young people into STEM in greater numbers.

The new career model aims to incentivise increased collaboration with industry, engagement with school and university students, and effective science communication through a broad range of social media and other platforms.

4. School and Community Outreach

ANSTO notes the interest of the Committee in the organisation's outreach activities to high schools and the broader community. Very recently, ANSTO has been deeply involved as a program partner with the World Science Festival in Brisbane. The festival seeks to raise public awareness and interest on the topics of science, technology, engineering and mathematics. Following on from a feature on ABC Radio, ANSTO's Fact or Fiction program opened the festival as an interactive event which seeks to engage children and adults through exploration of science in everyday life with the help of expert scientists. The event combines pop culture with hard science to provide an educational and entertaining show that is accessible to all audiences. A copy of the relevant media release is **Attachment A**.

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Media Release

Tuesday 21 March 2017

HOW MUCH DOES THE INTERNET KNOW ABOUT YOU? FIND OUT AT TOMORROW'S OPENING NIGHT OF THE 2017 WORLD SCIENCE FESTIVAL

Is the Internet infinite? How much does it weigh? What is the science of a selfie? All this and more can be discovered on tomorrow night at Conservatorium Theatre, on the opening night of the *World Science Festival*.

The Australian Nuclear Science and Technology Organisation (ANSTO) is the custodian of some of the country's most significant science infrastructure, and is bringing an esteemed panel of expert scientists to open the Brisbane event.

You'll have the chance to dissect the fact and fiction behind internet shopping, viral videos, and much more as we countdown the top 10 reasons people use the internet.

An interactive 90 minute show, ANSTO's *Fact or Fiction* has been touring the country, and this 2.0 edition is a fun way to look at science in our everyday lives.

All you need is a smart device to be part of the action, answering questions and voting live to see how much you really know about the World Wide Web.

One of the show's expert panellists, ABC Science's "Surfing Scientist", Ruben Meerman said talking about the weird and wonderful uses of the internet was a great way of making science more accessible.

"The internet is everywhere – we even have the 'internet of things' and what *Fact or Fiction* does is bring science closer to home with examples like internet shopping that demonstrate science isn't just in a test tube," Ruben said.

"It's going to be a really fascinating and fun night so I'm thrilled to be part of it all."

Discovery Centre Leader, Rod Dowler will be the nights' host and said ANSTO is excited to be part of the World Science Festival, and to be bringing *Fact or Fiction* to this stage.

"A great chunk of our society spends a lot of their time online – whether it's for work, to watch a show, to stay in touch with friends and family, it's an enormous part of 21st Century life," said Mr Dowler.

"*Fact or Fiction* is for adults, kids and anyone in between – it doesn't matter if you are a science whiz or you're simply curious, it's a chance to learn something new.

"Combining pop-culture with hard science fact, there'll be more than one answer revealed that will no doubt surprise the audience.

"The World Science Festival is about taking conversations regarding science, technology, engineering and mathematics out of labs and research facilities and onto the streets," Mr Dowler said.

"That is precisely why ANSTO conceived *Fact or Fiction*, to help people to be more aware of the science that is part of our everyday life.

"At the 2017 World Science Festival *Fact or Fiction 2.0 Web of Intrigue* is a great way to get the entire family involved – we will be busting myths on the big stage, and giving everyone some 'fun facts' to take home with them."

Fact or Fiction 2.0 appeals to all audiences as a highly entertaining and educational show, reaching beyond those interested in science by providing a big dose of pop-culture.

The event will be held at Griffith University's Conservatorium Theatre on Wednesday, 22 March from 8pm. To buy tickets go to www.worldsciencefestival.com.au/program/events/ansto-fact-or-fiction-evening-show/

For information on ANSTO, go to www.ansto.gov.au

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