REGIONAL UNIVERSITIES NETWORK (RUN)

Submission to the Review of Research Policy and Funding Arrangements for Higher Education

Recommendations

- Ensure that regional universities are adequately funded for research engagement with industry to drive regional development in the national interest.

- Ensure that the scope of programs designed to support university research-industry/community engagement addresses the heterogeneous mix of “industry” organisations in regional Australia.

- Expedite the timelines of grant systems such as the ARC Linkage Grants, the CRC Project grants, Australia China Science and Research Fund, and the Australia India Strategic Research Fund to better meet industry needs.

- Encourage an “enabling” approach to IP to facilitate greater take-up of university-generated ideas by industry.

- Preserve an appropriate balance between encouraging basic and industry-focussed research.

- Retain the current balance between research block grants and competitive research grants to fund internal, general research infrastructure at universities.

- Establish a new program of industry PhD scholarships, focussing on SMEs and non-commercial partners, to be partly funded by the Research Training Scheme (RTS) and partly by partner organisations. Ensure that a significant proportion of these scholarships are allocated outside capital cities to drive regional development, and provide industry partners with favourable taxation treatment.

- Recalibrate the formula to allocate funding under the RTS by removing the publications component, and weighting completions and student load at 30 per cent each.

- Set aside some funding from the RTS to attract research students to regional Australia in areas of national priority to facilitate regional development.

- Increase funding for the Joint Research Engagement (JRE) program, and adjust the allocation formula by including an element for research extension to enhance the uptake of new technologies, and removing the 10 per cent weighting for publications.
• Abolish the Sustainable Research Excellence program and redirect funding partially to JRE and partially to the Research Infrastructure Block Grants (RIBG) program, or solely to RIBG.

• Trial all changes to the existing programs during the development phase prior to any implementation.

• Encourage greater industry engagement with linkage-focussed, competitive grant programs.

• Keep the existing balance between competitive grants and research block funding.

• Establish strategic regional committees to bring together universities and industry along the lines of the English Local Enterprise Partnerships as a means to foster to university-industry collaboration and regional development.

• Further develop the Academy of Technological Sciences and Engineering model as a metric for university-industry engagement, or consider devising an approach that incorporates a range of metrics, peer review processes and a limited number of case studies in fields where metrics may not be appropriate.

• Do not use Excellence in Research for Australia rankings as a measure to determine the suitability of a research training environment.

Introduction

The issues paper published for the Review of Research Policy and Funding Arrangements for Higher Education highlights Australia’s excellent research performance in terms of its productivity, international engagement and global esteem1. However, the paper also points to Australia’s poor performance in terms of industry engagement with universities. Australia ranks 29th and 30th out of 30 OECD countries on the proportion of large businesses and small to medium enterprises (SMEs) collaborating with higher education and public research institutions on innovation2. Australia’s ranking has lagged that of most other OECD nations for many years despite the efforts of successive governments to improve its performance.

Our current higher education research effort is concentrated in a small number of elite, metropolitan universities. This is reflected in the funding arrangements which see the eight most research intensive universities attracting more than 68 per cent of the research income, 73 per cent of competitive grants income3 and almost 64 per cent of block grants for research and research training4. The remaining funding is shared among 33 higher education institutions including 29 public universities. The current funding allocation has failed to adequately encourage the engagement of universities with industry. Some have argued for the further concentration of research funding in elite, metropolitan, research intensive universities, including via the redirection of some Commonwealth Grant Scheme funding to a new research pool for which universities could apply5, or restricting the delivery of research training to universities that achieve an Excellence in Research Australia (ERA) rating of three or above in relevant fields6.

Regional universities, such as those in the Regional Universities Network (RUN), use their Commonwealth Grant Scheme funding to fund teaching and learning (including the support of many students who are not well

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1 Review of research funding and policy arrangements for higher education: Issues paper (2015), page 1
3 2013 HERC collection, Department of Education and Training
4 2015 Research block grant allocations, Department of Education and Training
5 2015 (11 August) Radical Plan to Boost University Research, Courier Mail
6 2015 (7 September) Call to Fund the Best and Forget the Rest, Australian Financial Review
prepared for university), research, regional development, community engagement and service. Further concentration of research funding in a few, metropolitan universities would prevent the growth of research in regional Australia which services the needs of business and the general community. If regional universities are funded to engage with regional business we will in turn use our expertise and broker others for the benefit of regional and rural Australia and for the nation as a whole.

ERA is an inappropriate measure for determining the suitability of a research training environment – it is retrospective, focussed on the number of citations of scholarly articles which is at odds with encouraging greater industry associated research, and does not assist in identifying areas of strategic or emerging research strength, or areas where excellent, lone researchers operate.

Regional Australia, where a third of the Australian population resides, needs more highly trained professionals, innovative research and engagement between universities and industry to drive regional development, supporting strategic and national priorities. Any attempt to further concentrate research funding in the capitals will work against these aims and against the national interest.

This submission suggests some ways in which more funding could be directed to universities that are industry and community focussed to drive regional development.

Information about the research effort, including the engagement with industry, of RUN universities, is given in the Appendix.

1. Overview of current policy and funding framework for university research

1.4.1 What are the main factors impeding the commercialisation of the research output of Australia’s universities?

1.4.2 What are the barriers to improving research-industry collaboration?

1.4.3 What are the best strategies to address these problems? What confidence should we have that they will make a difference?

One of the key obstacles to improving research-industry collaboration is that industry commonly perceives there is little value in engaging with universities, and has few PhD qualified staff employed that would be the natural point of contact with universities. The problem cannot be rectified by focussing solely on universities - engagement needs to be two way and engagement by industry needs to be encouraged through open communication channels and incentives.

‘Industry’ represents a heterogeneous mix of organisations of varying scale and different needs and capacity to engage in research projects. A large multinational will have the expertise and resources to commit to long-term projects requiring substantial cash commitments, whereas many small to medium enterprises (SMEs) may want to engage in research projects with less commitment. In addition to ‘industry’, there are also the community-led and non-profit service sectors which have their own characteristics.

The industry profile of regional Australia imposes specific challenges in terms of promoting research-industry engagement; it is characterised by a high proportion of micro and SMEs, a strong emphasis on the delivery of government services (such as education, health, social services and local government activities), agricultural businesses that commonly operate on cooperative models, and mining. Local government bodies delivering services represent important local industry in the regions.
The scope of programs designed to support university research and industry and community engagement should address these different needs and levels of commitment.

SMEs, by virtue of their small scale and limited resources, pose a particular problem. However, as at June 2014, they employed 7.3 million Australians and generated 56% of output in the non-financial private sector Industry Value Add\(^7\), and it is therefore important that engagement with these entities is effectively addressed.

Universities are good at very short term engagement (short research consultancies) and long term engagement involving PhD programs of several years’ duration. They are not as effective in pursuing mid-term engagement – typically involving a 12 month placement - because of the existing commitments of university staff. There will not be a uniform university engagement model. There will be discipline specific mixtures of engagement.

The CRC program should represent part of the solution to improving collaboration between research and firms of very different sizes and needs. The program has traditionally played an important role in building links between industry and universities and has supported the training of many PhD candidates in industry settings. The recent CRC review outlined a range of recommendations, including revising the program’s objectives to place industry at the program’s heart, and creating a new stream of activity – CRC Projects - to support short-term industry led research. The CRC Projects stream is likely to be particularly attractive to SMEs given their need for a quick turn-around for research. A revitalised and well-resourced CRC program should play an important role in enhancing collaboration and improving innovation outcomes.

Another initiative that is building strong links between industry (mainly SMEs) and university research is the Australian Mathematical Science Institute’s (AMSI’s) highly successful PhD internship program. Collaborations are established between firms, participating universities and AMSI, with PhD interns being based in the firm for a period of four to five months to address problems. The program currently encompasses a wide range of STEM disciplines, business, economics and marketing, and its activities are centred in Sydney and Melbourne. AMSI has placed 140 interns to date and has plans to place 1,000 on a nation-wide basis within five years. Costs, including a stipend for the student, are borne by the firm, and the firm is able to attract taxation benefits. Further uptake of this initiative by universities, including in regional areas, would further build university-industry research links.

The timelines of grant systems such as the ARC Linkage Grants, the CRC Project grants, Australia China Science and Research Fund, and the Australia India Strategic Research Fund etc. are an impediment to collaboration between universities and industry. Industry has urgent problems to solve, and yet many of the grant processes take about a year before the outcomes for funding are known. A solution would be to run three or four rounds per annum of the schemes, or to perhaps take applications at any time, batch them up, and run an assessment when there are sufficient numbers to justify a round.

An “enabling” approach to IP would facilitate greater take up of university generated ideas by industry.

Fundamental research is critical and any adjustments to encourage industry collaboration and commercialisation outcomes should create an appropriate balance preserving the nation’s capability and activity to create new ideas and innovations.

\(^7\) 2015 ABS publication 8155 Australian Industry 2013-14
1.4.4 Is the dual funding system for competitive grants the most effective way of providing support for the indirect costs of these grants? Why is it? Would any other approach be more effective?

Any decision to tie block funding more closely to competitive grants in order to more directly support the indirect costs of research would further concentrate research funding in elite, metropolitan universities to the detriment of regional development, regional research, regional communities and regional universities. Research block grants are used to fund general research infrastructure within universities e.g. to assist in library purchases, specialist collections, IT support, and access to high end infrastructure elsewhere. Tying block grants more closely to competitive grants would reduce the flexibility to fund such internal infrastructure, as money would be spent on grant specific grant outcomes rather than more general support.

2. Research block grants (RBG)

2.3.1 Does block grant funding still have a role to play in funding research?

2.3.2 Is block grant funding distributed by performance-based formula still the most appropriate way to allocate funding? If not, what alternatives might be suitable?

2.3.3 Are the current allocation formulae still fit for purpose? If not, how might they be changed to improve alignment with policy objectives?

RUN supports the provision of block grants for research and research training and the use of performance-based formula but recommends the following changes to the existing programs to further drive university-industry collaboration:

- **Establish a new program of industry, with a focus on SMEs, and non-commercial partner PhD scholarships** funded in part from the existing Research Training Scheme (RTS), with matching funds or in-kind support provided by the commercial partner. RUN proposes that in the order of 300 scholarships be awarded each year, with the total annual value of each scholarship amounting to $60,000. Partners would host the PhD candidates. In order to drive regional development, we suggest that a significant proportion of the scholarships be allocated to universities outside capital cities. Participating industry partners would attract favourable taxation treatment. This initiative would drive research-industry (including SME) collaboration, regional development and encourage research training within regional communities, building a resource of highly skilled professionals.

- **Recalibrating the formula to allocate funding under the RTS.** After adjusting for the transfer of funds to the new PhD scholarships program, amend the formula to allocate RTS funding by removing the publication component (currently weighted at 10 per cent), and weight completions and student load at 30 per cent each. (Student completions are currently weighted at 50 per cent and load is not taken into account.) The existing publications element has minimal impact on the overall distribution of funding and has little value in driving industry engagement. Incorporating a student load element would recognise the up-front costs to the university in providing a high quality research training environment and help to support activities such as industry placements and coursework training. Some funding from RTS could be set aside to attract research students to regional Australia in areas of national priority to facilitate regional development.

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8 Partners in the scholarships program would include SMEs and non-commercial entities such as NGOs, local governments, etc. The partners would host the PhD students. The scholarships could be awarded to domestic and international PhD students in any discipline, with priority to be given to students in fields that align with national priorities.
• **Increase funding for the Joint Research Engagement (JRE) program, adjust the allocation formula, and include an element for research extension to enhance uptake.** The JRE scheme provides funding to enable universities to support their research strengths and facilitate collaborative research activities between universities, industry and end-users. Current funding for the program is around $360 million per year. Some funding could be redirected from the SRE program (see below) to provide additional money for industry engagement and for extension activities to promote the uptake of new technologies.

The funding formula for JRE should be adjusted to remove the 10 per cent weighting for publications as it does not align with the objectives of the program. The overall weighting for research income (Category 2, 3, 4) should be increased accordingly. Research income should be modified to include income from ARC Linkage grants and RDCs (currently included in Category 1) as these programs have a strong industry focus. Further changes to the formula could be considered if warranted.

• **Abolish the Sustainable Research Excellence (SRE) program and redirect funding** partially to JRE and partially to the Research Infrastructure Block Grants (RIBG) program (see above), or solely to RIBG. SRE and RIBG both help universities to meet the indirect costs of research associated with competitive research grants. Funding for the SRE program amounts to $857 million over the forward estimates period although it varies substantially from year to year. Redirection of some SRE funding to JRE would put more emphasis on industry engagement as is the current priority. Alternatively, redirecting all of the SRE funding to RIBG would continue to support the costs associated with competitive grants at the same order of magnitude as is currently anticipated.

2.4.4 **For any changes canvassed in response to the above questions, will there be a need for any transitional arrangements? If so, what sort of arrangements and for how long?**

It will be important to trial all changes to the existing programs during the development phase, preferably on a virtual basis over a twelve month period, with universities being provided with access to data and modelling on a confidential basis, prior to any implementation. The scope and duration of transitional arrangements should reflect the likelihood of significant shifts in funding to individual institutions, that is, the greater the potential for adverse impacts, the greater the need for effective, phased transitional arrangements.

3. **Competitive grants programmes**

3.3.1 **What changes would support increased recognition of industry experience alongside research excellence in competitive grant processes?**

3.3.2 **What changes would address any barriers to industry participation as partners in research funded through competitive grant programmes?**

3.3.3 **What role/value would entrepreneurs and business representatives add in the competitive grant process, either as staff or as representatives on advisory and assessment bodies?**

3.3.4 **How could industry expertise play a more central role in the peer review process for competitive grant programmes to ensure research with the best potential for commercial outcomes is given greater priority in relevant programmes?**

3.3.5 **Could assessment criteria in relevant grant schemes include greater weightings for likely predictors of commercial benefit such as ‘record of commercial achievements’ and ‘commercial potential of research’?**
3.3.6 Is there a need for a greater focus on competitive research programmes which specifically support early stage commercial research endeavours, such as proof of concept funding and require tangible progress toward a commercial outcome within a five-year timeframe?

RUN supports a range of measures that would encourage greater industry engagement with competitive grants programs. These include:

- Increasing funding for ARC Linkage grants.
- Amending the selection criteria for Linkage grants to provide greater weighting for project outcomes and the partner, and less weighting for the researcher’s track record.
- Ensuring that panels for ARC Linkage grants and NHMRC development grants include greater industry representation.
- Giving greater consideration to the time a research investigator has spent in industry (detailed in the ARC’s ‘ROPE’ (Research, Opportunity, Performance and Evidence) statement), and considering making industry experience a specific part of the assessment criteria for Linkage grants.
- Encouraging ARC Linkage Grants to include industry-embedded research training which should be open to international students.
- Providing more explicit recognition in competitive grants assessment processes and university promotion processes for staff that move between industry and academia.
- Providing funding for early stage industry collaboration.
- Creating a requirement for a pathway to adoption and a relevant assessment criterion in ARC Linkage, R&D Corporation, NHMRC Partnerships and other industry aligned grants would enhance commercialisation (or exploitation) of any outcome.
- Continuing the focus of discovery-based programs on basic, pure research.

4. Performance of the research system

4.3.1 Is there a better balance between competitive grants and Research Block Grants which would improve the commercial returns from research?

RUN considers that the existing balance between competitive grants and block funding is appropriate.

4.3.2 Are there useful international models for increasing research-industry collaboration which could be implemented domestically?

RUN recommends that regional committees be established to bring together universities and industry along the lines of the England’s Local Enterprise Partnerships (LEPs)\(^9\), as a means to foster to university-industry collaboration and regional development. (Australia’s Regional Consultative Committees are not sufficiently strategic.) The LEPs are established on a volunteer basis, and strategic priorities are developed following a

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bottom-up and top-down approach. A recent paper\textsuperscript{10} called for universities to accept a third mission, in addition to teaching and research, to engage with SMEs through local enterprise partnerships. New Zealand is already linking schools, tertiary institutions and employers to ensure that businesses can hire new workers with confidence, and Australia could benefit from a similar approach.

England has recently also introduced University Enterprise Zones, with dedicated funding, which will allow universities to push through local growth plans and support entrepreneurship and innovation. The zones will allow business spaces to be built that can host a range of new high-tech companies in the early stages of their development.

\textbf{4.3.4 How could measurement of university/industry engagement be improved?}

\textbf{4.3.6 How could research impact be measured?}

The Academy of Technological Sciences and Engineering (ATSE’s) research engagement model uses industry income as a proxy for engagement. It is too simplistic, too narrow and not sufficiently robust to drive funding in its current form. It would be possible to further develop the ATSE model or consider devising an approach that incorporates a range of metrics, peer review processes and a limited number of case studies in fields where metrics may not be appropriate (e.g. arts).

Professor Pierre Viljoen, DVC (Engagement) CQUniversity, has developed a tool to quantify the engagement of university staff (a separate briefing has been offered to the review panel to provide further detail on this). It would be possible to adapt this approach to capture in-kind research collaboration with industry and complement income data.

All universities should be fully consulted on the methodology and potential impact of any new mechanism to measure engagement before it is introduced, particularly if there are any funding implications. The introduction of any such arrangements should be undertaken on a phased basis, with a safety net to minimise adverse financial impacts.

\textbf{4.3.7 Is it appropriate to require the application of consistent IP management principles and processes across the sector? If so, how?}

An enabling and streamlined approach to managing IP, as exemplified by the UNSW EasyAccess IP model, would assist in the uptake of ideas by industry. Under the UNSW model, IP that a university will not patent or license is made available to end users free of charge based on a one-page agreement between the parties. For UNSW, this represents about 85% of its total IP.

5. Research Training and Employment

5.3.1 How could research program structures and rules be improved to remove blockages to more flexible and innovative HDR delivery?

5.3.3 Would a move away from institutional funding towards student based funding improve HDR delivery?

Encouraging industry-supported PhD scholarships, and broader industry-engaged PhD programs such as the Industry Doctoral Training Centres, would promote more flexible HDR delivery.

We propose a new program of industry, with a focus on SMEs, and non-commercial partner PhD scholarships\(^\text{11}\), funded in part from the existing Research Training Scheme (RTS), with matching funds or in-kind support provided by the commercial partner. RUN proposes that in the order of 300 scholarships be awarded each year, with the total annual value of each scholarship amounting to $60,000. Partners would host the PhD candidates. In order to drive regional development, we suggest that a significant proportion of the scholarships be allocated to universities outside capital cities. Participating industry partners would attract favourable taxation treatment. This initiative would drive research-industry (including SME) collaboration, regional development and encourage research training within regional communities, building a resource of highly skilled professionals.

ERA is an inappropriate measure for determining the suitability of a research training environment – it is retrospective, focussed on the number of citations of scholarly articles which is at odds with encouraging greater industry associated research, and does not assist in identifying areas of strategic or emerging research strength, or areas where excellent, lone researchers operate.

\(^{11}\text{Partners in the scholarships program would include SMEs and non-commercial entities such as NGOs, local governments, etc. The partners would host the PhD students. The scholarships could be awarded to domestic and international PhD students in any discipline, with priority to be given to students in fields that align with national priorities.}\)
APPENDIX

Background

Research is a fundamental part of being a university and research training is a vital element in the research effort. Regional universities play a key role in research and research training, innovation, productivity and national development. They drive regional economic, social, cultural and environmental development, and help to unlock human potential of their regions, and thus the nation.  

The Regional Universities Network (RUN) is a group of six regionally-based universities comprising CQUniversity, Southern Cross University (SCU), Federation University Australia, University of New England (UNE), University of Southern Queensland (USQ), and the University of the Sunshine Coast (USC).

Research undertaken at RUN universities is regionally embedded but internationally engaged. Most RUN universities have strengths in agriculture and rural health research – issues that are crucial to the economic and social fabric of their communities, and which are aligned to the Government’s national science and research priorities. RUN universities are developing research flagships in areas of research strength and strategic, regional importance, focussing initially on precision agriculture and water landscapes, and planning to extend this to regional health.

RUN universities are relatively small in terms of their research activity and funding but they are on a strong growth trajectory. They have outpaced the sector in terms of growth in research income from competitive grants and from ‘industry and other sources’. Between 2006 and 2013, research income at RUN universities from competitive grants, and from ‘industry and other sources’, increased by 97 per cent and 126 per cent respectively. Research income from these sources the across sector as a whole grew by 76 per cent and 48 per cent respectively over the same time period.

Much of the research and research training being undertaken at RUN universities is being driven by industry (broadly defined to incorporate the non-commercial and not for profit sectors), and is achieving industry driven outcomes. There is a strong focus on translational, applicable and solution-focused research, often conducted in very close partnership with the users of the research. Regional universities help to build resilient communities. They assist regionally based SMEs by providing portals to technology. The research performed by regional universities also plays a key role in supporting regional development and in supporting community driven research programs that deliver innovation services and practical service models, in fields such as health and social wellbeing. RUN universities have particularly strong links with Rural Research and Development Corporations (RDCs), accounting for more than 10 per cent of all RDC funding allocated to higher education institutions.

RUN’s focus on industry engagement is reflected in the rate of growth of ‘industry and other sources’ funding cited above but also by comparing the relative importance of Commonwealth and industry sourced

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13 The Australian and New Zealand Standard Industrial Classification (ANZSIC) framework includes companies, non-profit organisations, government departments and enterprises. Industry sectors that are dominated by the non-commercial/not-for-profit sectors include public administration, education, health and social services, and arts and recreation.
income. For every dollar of research income RUN universities received from Commonwealth sources in 2013 (other than block grants), they received approximately $0.72 from industry sources (industry contracts and grants, Rural RDC grants, and non-Commonwealth sourced CRC funding)\(^1\) compared to a sector-wide average of $0.25. The Group of Eight universities, while receiving far more research funding overall, attracted only 22 cents from industry for every dollar of Commonwealth funding. As small, nimble institutions operating in a competitive environment, RUN universities are engaging with industry and their communities in a highly strategic manner.

Some case studies illustrating RUN’s applied research are given below.

1. **CQUniversity research to minimise risks of fatigue to firefighters**

A CQUniversity researcher is collaborating with a colleague at another university, and peak fire agencies and relief crews to identify how best to help some 220,000 highly motivated, selfless volunteers look after themselves during fire suppression campaigns. Research shows that volunteers can perform physically for extended periods of wakefulness, but their decision-making ability is impaired, as is their judgement of how much they are impaired. Volunteer fire fighters are a critical and limited resource in the regions. Their health and wellbeing needs to be looked after while they perform their essential tasks.

2. **Federation University Australia and IBM**

The Ballarat Technology Park associated with Federation University Australia hosts IBM’s primary regional delivery centre in Australia with capacity for approximately 1,000 people. IBM operates in partnership with the University to offer a Bachelor of IT (Professional Practice) which provides undergraduate students with industry experience during their four year program. Students are paid at least $35,000 over the course of their degree and are offered a position with IBM or another program sponsor on graduation.

3. **Southern Cross University researchers working to reduce overheads for farming families and replenish soils in developing countries**

An SCU researcher is examining fertiliser management strategies to increase crop uptake of fertiliser nitrogen, and breeding options to address phosphorous fertiliser issues. This research has the potential to reduce expensive fertiliser costs for Australian farmers but it is also globally relevant research with the potential to stave off malnutrition in developing countries. In developing nations, political instability and migration are often associated with impoverished populations and malnutrition brought on by the inability to afford or access fertilisers. For farmers in these nations, the outcomes of this research can mean the difference between food on the table or going hungry.

4. **University of New England community-driven research programs with partners in the New England area where research will deliver innovation services and practical service models:**
   - SmartHouse (sensors, disability services; Royal Rehabilitation College as partner)
   - No Wrong Door (Pathfinders, Homes North, Family & Community Services and others as partners)
   - Proper Parenting (CentreCare, Pathfinders, Homes North, Family & Community Services and others).

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5. University of Southern Queensland collaborating with John Deere

The global agricultural equipment and services provider John Deere and USQ’s National Centre for Engineering in Agriculture (NCEA) are working together to develop machine automation and control technologies to improve agricultural productivity and reduce production costs. The collaboration will lead to improvements in existing technology and new innovations for John Deere’s tractors and other farm equipment.

USQ is the only Australian university to offer a degree in agriculture engineering and the partnership will provide students with the opportunity to gain industry experience with a globally respected company. The partnership will also allow the NCEA to develop a potential gateway for the commercialisation of other technologies the centre has been developing.

6. University of the Sunshine Coast researchers working to protect livestock from disease and reduce costs for Australian farmers

A USC researcher is trialling a vaccine against Chlamydia, a bacterium which is a problem in humans, but which also a problem for livestock such as sheep and cattle, and for koalas. Around 40 per cent of Australian sheep carry the bacteria but only some of them go on to develop the disease. A number of countries are rejecting shipments of live Australian sheep on the dubious grounds of Chlamydia infection. In koalas, Chlamydia is causing localised extinctions of this iconic native species.

The researcher and his collaborators want the vaccine to be effective in sheep, cattle and koalas. However, delivering the vaccine will require substantial additional funds in excess of the considerable ARC funding they have won to date.