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COLLABORATION AND THE CASE FOR CERTAINTY

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VC'S SPEAKING NOTES

Ladies and gentlemen, thank you for joining me for my second address to the National Press Club as Chair of Universities Australia.

On the 11th of February David Reitze of the Laser Interferometer Gravitational-Wave Observatory (or LIGO) announced to the world: "We have detected gravitational waves ... We did it!"

The news ignited the public imagination. A brief but startling audio grab of black holes colliding went viral. Millions of us tried to fathom just what it all meant. We could see the universe but now, we were told, we could *hear* it.

Much has been said in recent weeks by my colleagues, the scientific community and notably political protagonists about the countless implications, and indeed applications, this discovery has in broader society.

I don't need to add to that extensive commentary. However, I must acknowledge the pivotal contribution of the International Gravitational Research Centre in Gingin, part of the University of Western Australia, who were instrumental in stabilising the US detectors that went on to make the astounding discovery.

It's also interesting that a different set of waves has us on the brink of scientific breakthroughs of comparable significance to the LIGO project, with similarly wide-ranging potential.

Radio waves can penetrate "clouds of dust and gas in space... to reveal objects and processes not visible" to standard telescopes. Australian astronomers – including researchers from Curtin University and the University of Western Australia – are a critical component in a global effort to build the world's biggest radio telescope, the Square Kilometre Array - SKA.

Professor Brian Boyle, in his role as Australian SKA Project Director, describes it as "a truly transformational scientific instrument". We will most certainly discover things beyond our imagination. For me, that is the pivotal point. Like the LIGO, the SKA and its innumerable possibilities would not exist without deep curiosity and fundamental research and, even more importantly, collaboration.

Pleasingly, the Government has committed funds to support the Australian contribution to this vital project. This is encouraging as we look to the SKA and its potentially wide ranging, and in many respects unknown, applications.

For instance, the SKA will be significant in driving research in big data, allowing us to analyse huge amounts of data in almost unimaginable ways. To quote Professor Peter Quinn from the International Centre for Radio Astronomy Research:

> *A telescope like the SKA represents a revolution in our ability to capture data from the Universe … 10,000 times more … than any previous facility… and … gather, store and manipulate data at a scale comparable to the total current computational capabilities of the entire world … the SKA will provide the drive and opportunity to create new technologies with wide applications that will surely change our lives."*[1].

The SKA is a project in its infancy and its potential for real world application is vast and in many respects still to be determined. What we can learn from the recent gravitational waves discovery is that with time, and a strong emphasis on collaboration, across disciplines and with industry, the possibilities are unlimited.

We need to imagine those possibilities, and take the risks.

This is what I am going to ask of you today. There can be no innovation without investment, and no technology transfer without deep and sustained collaboration between government, universities and industry.

These <u>are</u> risk-laden, complex matters that go to the heart of our national interest. They are matters that should be at the core of the policy debate and at the front of the public's mind in the forthcoming election.

These are the matters that I first raised with you at this venue six months ago. A lot has happened since that time.

On behalf of Universities Australia, I launched 'Keep it Clever', a policy statement where we promoted accessibility, affordability, quality, capability, resourcing, accountability, autonomy and stability as principles to be enshrined in a contract between Government, universities, industry and most importantly the broader community.

[1] http://www.icrar.org/multimedia/interviews_with_researchers/professor_peter_quinn#Q7

In the months following, the Prime Minister released the National Innovation and Science Agenda, NISA. We are, to quote the Prime Minister, in the beginnings of an "ideas boom".

Universities Australia agrees with the Government's innovation pitch. The world is, as they observe, "moving rapidly and we face an uncertain global economy."

We have, as they reflect, "been good at having ideas."

And we do, as they assert, need to "get better at innovation, turning ideas into successful products and services."

These are precisely the priorities I highlighted last October. Clearly, the bedrock of the contract UA seeks with Government is firmly in place. This is a very encouraging start.

Getting to the top is important, and, as the Government assures us the view up there is "new" and "exciting", but it's the leap that matters. So often, it is at this challenging part of the policy process where we have struggled to take off.

We are all-too-familiar with the impediments. Australia ranks poorly among OECD countries for the level of companies collaborating with higher education or public research agencies.

The NISA rightly puts forward a series of measures designed to not only remediate the problem but make collaboration a strong point of Australian innovation.

It is pleasing that the NISA takes heed of many of UA's recommendations on innovation as well as adding to the existing work already taking place across Australian universities.

The proposed new Incubator Support Programme echoes our push for a Student Innovation Fund. Strong government investment in incubator programs is a common feature in leading countries in innovation like Israel and the United States. There has been a substantial investment in Australian universities in recent years in incubators and in courses devoted to enhancing entrepreneurship.

Last October, I opined in The Australian about the need to - in the right circumstances - pick winners in research. Citing the work of physicist, Michelle Simmons, at UNSW and her research team's "game-changing" work in quantum computing, I called for "targeted investment" in innovative industries where we already led the field.

It was pleasing to see significant Government funds – $26 million – committed to what I am convinced will be a catalyst for employment, increased productivity and knowledge growth well beyond the initial investment. Add to that, $20 million in industry support from Telstra and the Commonwealth Bank and this venture begins to look very promising – a great example of a university, industry and government

partnership. Perhaps it should be located alongside tech giants at the proposed Walsh Bay innovation precinct in Sydney.
So, all in all, the NISA is an important milestone in our transformation journey but as the Prime Minister and the Minister for Industry, Innovation and Science have often stated it cannot be the end of the story.

And so to the next chapter, the Commonwealth's review of the R&D Tax Incentive program.

Directed by Bill Ferris, Alan Finkel and John Fraser, the review panel are looking to "identify opportunities to improve the [incentive's] effectiveness and integrity" and encourage "additional R&D expenditure".

The review is incredibly significant when you consider that R&D tax incentives account for roughly 90 per cent of the Government's support for innovation among Australian businesses, and around 30 per cent of the Government's total spend on science, research and innovation; a proportion of national expenditure that has doubled over the last ten years alone to now reach over $2.9 billion.

Over the course of that decade, we have seen only marginal improvement in Australia's innovation performance. The vast majority of innovation undertaken in this country is limited to the adoption and modification of foreign innovations. Of those Australian businesses that do introduce innovations, between 75 and 92 per cent are new-to-firm only, rather than being new to the region, industry or world – we lack the spill-over effects.

With a view to maximising the return on taxpayer investment, and in the interests of optimising Australia's competitiveness, productivity and capacity through innovation, UA has submitted a detailed set of recommendations to the review panel. Foremost are those designed to encourage businesses to collaborate with public research organisations.

Six other OECD countries – France, Italy, Iceland, Japan, Hungary and Belgium - offer more favourable R&D tax incentives to businesses that collaborate. Our current scheme already offers higher tax concession rates for small-to-medium enterprises; however, the lack of programmes to encourage those same SMEs to take innovations developed with universities out into the market is cause for further concern and warrants attention.
We believe the introduction of a premium tax concession rate for businesses collaborating with public research institutions could substantially improve its effectiveness in supporting cutting edge innovation. It would also further increase the utilisation of our world-class research infrastructure.

Beyond tax incentives, Australia needs to consider seriously whether we have the balance between direct and indirect support for innovation right. In international terms, we have an unusually high reliance on tax-based support. This is an important part of fostering innovation, but it can't do everything.

Direct funding can better target high growth sectors and policy goals, such as greater collaboration, and can be more effective for small businesses and start-ups.

By way of example, the US Government have, since 1994, provided an uncharacteristically interventionist direct grant scheme to support business innovation and collaboration. The Small Business Technology Transfer program has proven a particularly effective mechanism for lifting the level of commercialisation by SMEs of publicly funded research. To be eligible for support a small business must collaborate with a non-profit research institution such as a university or a similar organisation.

The US model is just one of many international programs producing the collaborative dynamic that, in Australia is so promising, yet so underdeveloped. These are the triggers that are critical in activating and amplifying the extraordinary - yet comparatively latent - capacity for innovation Australian industry and researchers have.

Yet of course the starting point for both potential and fully-realised innovation alike is fundamental research.

We must not lose sight of the critical role of fundamental research, as both a pre-cursor and driver of industry-university collaboration. Without it, we would have nothing to translate and nothing to commercialise.

The importance of investigator-led fundamental research is acutely apparent in the story of a recent licensing agreement – worth in excess of $700 million - signed between Australian researchers and US and UK partners to commercialise a suite of drugs for the treatment of both cancer and non-cancer blood disorders. This potentially transformative pre-clinical project was developed by the Melbourne based, Cancer Therapeutics Cooperative Research Centre or "CTx".

The drugs act as inhibitors of the protein PRMT5. High levels of this protein are found in a variety of cancers and are linked to poor survival. These drugs were developed through an industry-engaged programme based on an initial discovery in 2005 by Professor Stephen Jane from Monash University.

Professor Jane recently reflected that the journey from discovery to commercialisation was (in his words), "extremely difficult, and cobbled together with support from a variety of sources. Only with the advent of the partnership with CTx", he added, "did the commercialisation pathway become clearer."

We're talking about one of the largest licensing deals in the history of Australian research, so it's worth noting its defining characteristics.

First, it wasn't planned. Professor Jane was looking for one thing and inadvertently found another. So the path to development and commercialisation isn't necessarily clear at the outset.

Second, it took a long time. Professor Jane's original analysis of sickle cell and thalassemia treatments began in the early 2000s. A 15-year lead-time and the project still has substantial time to run.

Third, the project's success was inexorably dependent on quality research infrastructure. As the CTx CEO observed: "Other key infrastructure funded by the Government... was essential for this project." Compounds Australia, based at Griffith University "was the only facility of its kind in Australia that could manage chemical libraries required for high throughput screening". CSIRO's structural biology group were also a critical partner, making "extensive use of the Australian Synchrotron to determine [the] crystal structures of the protein".

The final point I am compelled to make on this project is its extraordinarily large return on a comparatively minor investment. The initial CRC funding was $37 million, with the Government committing an additional $34 million through to 2020. Even before these treatments look like hitting the shelves, we are already looking at a ten-fold value-proposition. Consider this multiplier in the context of Government subsidies of other industries, many long-term, far greater in cost, and without anywhere near the capacity to provide an ongoing boost to the nation's intellectual capital, innovation agenda and productivity or to the health and wellbeing of its citizens.

Of course research and innovation is not just about investment and return. Allow me to share with you another example of successful collaboration that illustrates the social dimension in innovation.

Since its establishment in 2011, the Young and Well CRC has worked with over 70 Australian and international partner organisations across the non-profit, academic, government and corporate sectors. The Centre's remit is to explore how "technologies can be used to improve the mental health and wellbeing of young people aged 12-25 years."

Work on improving mental health awareness and service engagement initiatives has understandably been a particularly high-priority for the Centre, with an estimated seven people per day losing their life to suicide. The Centre's Chair, Mark Mentha, also emphasises the economic cost, citing research estimating "the poor mental health and wellbeing of young Australians currently costs the... economy more than $48 billion each year".

The Centre has made extraordinary inroads in the evidence-based development of technology-aided mental health programs that seek to address issues ranging from drug abuse, to promoting help seeking behaviour amongst youth, to supporting the challenges faced by young people within our Indigenous communities. This work could not have happened without the collaborative efforts of universities including Queensland University of Technology, the University of South Australia, Western Sydney University and the University of Newcastle.

These are without question transformative programs. They are evidence-based. They change lives. They resonate across peer groups and in some cases generations. They

are accessible, device-driven, user-shaped, highly-collaborative, and unquestionably innovative. Their deeper value, however, in the lives of those the programs affect cannot be quantified.

In addition to CRCs, it is also important to recognise the vital contribution of the ARC Centres of Excellence and Linkage programmes and the Industrial Transformation Research programme in supporting collaborative research efforts and delivering long term outcomes.

Separate to these programs are the collaborative success stories achieved without significant government support. One notable example being the Woodside Petroleum Research Centre at Curtin University which delivered a novel cryogenic contaminant removal system for natural gas which involved widespread industry collaboration and which was ultimately acquired by a multinational oil and gas company for further development and potential commercialisation.

Universities are at the heart of these collaborative programs and initiatives – we have the 'zeitgeist' and we have had it for a long while notwithstanding the structural challenges that we face in Australia in fostering deep and widespread collaboration with a dispersed industry base often lacking sophisticated local R&D capability.

It is clear that Australia's collaborative research programs in their broad sweep fulfil the 'promise on the box'. They do meet core government expectations concerning the development of "real world solutions" and "new technologies", the creation of "new markets and export opportunities" and the building of "capability and capacity for industry". But they do much more than that.

The centrality of our universities in these programs has driven the pursuit of 'high risk' projects otherwise unlikely to attract industry support. Collaborative programs have infused industry partners with cultures of exchange that have, in equal measure, brought about greater practical focus on the part of university-based researchers. The by-product of which is increased competitiveness, quality and productivity on the part of both researchers and industry.

In concert with the NISA framework and its objectives, I urge Government, industry and, indeed, my colleagues in the university and broader research community to continue to support the collaborative programmes that have sustained Australian innovation over the past three decades and must do so well into the future. These programs work and we need to get behind them, to substantially increase Commonwealth investment in them - it is in all our interests, and importantly, the national interest to do so.

I've spoken at some length about the nature and complexity of university-industry collaboration as a vital policy goal for Australia. Revised incentives, targeted programmes and greater synergy on the part of industry and the university community will, however, amount to little if not accompanied by progressive and sustainable reform of the higher education and research policy framework.

Before I turn specifically to the topic of reform in the higher education sector, let me briefly reflect on the context in which new ideas in general are treated in this country and in doing so, call for a degree of innovation in our approach to policy reform.

The pace of policy debate in 2016 careers along at a breakneck speed. Great ideas are most certainly not absent from this rapid churn.

The markedly sophisticated innovation reform proposals of both Government and Opposition are testament to that. But increasingly, talk of reform is barely given room to breathe before it is panel beaten unrecognisably. Reform is difficult at the best of times and is made more difficult when grand reform ideas are quickly taken off the table, the risk being the eradication of anything remotely catalytic.

It's vitally important that we establish a tone that speaks to the possibilities of reform rather than the limits of party-political paradigms. This is especially relevant in this election year but more so in light of the considerable challenges Australia's universities face in the decades to come.

In a setting where reform is approached with such reductionist cynicism; just what is it we are missing? I would argue we are missing the chance to do the very thing, as a nation, I demonstrated we can be so good at in my earlier remarks on research collaboration. That is, we are missing the opportunity to grow, develop and excel through a cognisant, progressive and collaborative approach to reform.

Of course it would be remiss of me to reflect so pointedly on the dynamics of Australian political reform without addressing higher education reform. In many respects this issue has been subject to the many pressures I've discussed.

Without traversing the policy and political landscape since the announcement of the Government's higher education reform package in 2014, it is important to note, that despite the Senate's opposition, the reforms in their original form continue to be Government policy as reflected in the various financial and budget papers.

With Senate reform looming, these are far from 'dead in the water' - as some have repeatedly suggested. What we don't yet know, is whether these will continue to be the Government's position in the lead up to the election.

Almost two years of policy insecurity and uncertainty is taking its toll on the ability of universities to plan and allocate resources in their student's best interests. It is difficult to imagine any other industry tolerating such policy instability. Yet when it comes to higher education – the majority contributor to Australia's third largest export industry, the cornerstone of Australia's innovation future, and a $140 billion contributor to our economy in 2014 – the rules are different.

It remains the case that policy certainty and stability continues to be the sector's number one advocacy priority.

The Opposition has released a comprehensive higher education policy but questions remain - not least around base funding and the means for sustaining the system over the longer term.

In recognising the issue, Education Minister, Senator Birmingham, has broadly consulted with stakeholders as he considers options for change.

We encourage the Government, and again I don't think it unreasonable, to make its' position clear – sooner, rather than later.

As I have emphasised throughout this address and indeed, as UA have consistently emphasised in our active, evidence-based contribution to higher education policy development, we believe the time has come for a national agreement on the future of higher education in this country.

We have strong views, we have our own ideas, we have invested a great deal in the research and analysis that informs those ideas and we have strived to posit a way forward but we do not pretend to have all the answers. It is no secret that while there is a great deal on which Vice-Chancellors are in substantial and unwavering agreement, there are matters of continuing debate amongst us.

However, the most important debate on higher education in this election year is not the one within the university sector but the public debate: the engagement our political leaders have with the Australian people. UA, like all of us, wants that debate to be open and informed.

We believe a public debate that reflects the complexity of these issues is critical and it should be one in which the respective parties clearly articulate the following:

- the principles that guide and the objectives to be achieved by their higher education policies;
- the key reforms that will deliver those objectives;
- the proposed means for delivering a sustainable and stable higher education system; and
- the implications of these policies for students, universities, industry and indeed government itself over the longer term.

So with an election in the offing, I take this opportunity on behalf of Universities Australia to urge both parties to engage in a sophisticated public debate and purposeful discussion on the higher education, research and indeed, innovation challenges we face today and in decades to come. Universities Australia stands willing to do what we can to support such a debate, perhaps hosted at this venue.

The discovery of gravitational waves and the enormous possibilities of the SKA not only inspire us, but remind us of just what can be achieved when universities,

researchers, industry and governments share their knowledge, combine their experience, and apply their expertise to an agreed end.

It reminds us that innovation not only requires deep and sustained collaboration between and beyond universities but patient and serious investment. It reminds us that we should dare to imagine what might lie beyond what we know today.

If we are as a nation serious about our intellectual development, about research and innovation, about a new economy fuelled by ideas then we need to think about education as an essential government responsibility requiring high levels of sustained investment over the long term. We need to think about education as we think about the economy: the means for personal security and national prosperity. We need to think about education in the way we think about the arts: as food for the soul and as the expression of who we are as individuals and as a society.

That is why this debate matters. The time really has come for a national agreement on the future of higher education.

Ladies and gentleman, thank you.

- Ends -