Australian Council of Deans of Science

NOTES – Monday 9 November

Session 1: The Australian University Science Engagement Campaign. What is its impact and how do we grow it?

Karen Taylor and Heather Catchpole – Refraction Media

Karen and Heather are the founders and Co-CEOs of Refraction Media and have been producing the ACDS' *Australian University Science* Magazine since publication of the first issue in August 2019. The fourth issue was recently published. In their presentation, they presented a broad overview of the magazine's reach since its inception, and some of the challenges associated with developing a consistent, focussed communications strategy and narrative about Australian University science, given the broad scope of our operations:

- Each eight-page issue of the magazine is distributed both electronically and in print (3,000 issues).
- The individual stories are all uploaded onto the Science-meets-Business website (which is owned by Refraction Media). This website is focussed on research, innovation, collaboration, and commercialisation, and is an ideal place for stories about University science to reach a large and relevant audience.
- To date, the stories on University science have reached over 17,500 unique viewers.
- Over the four issues that have been released to date, over 4,000 print copies of the magazine have been distributed to a targeted audience of politicians (every State-based and Federal MP), Industry and University leaders, Chief Scientists, and Government Agency leaders. The aspiration is to present a consistent narrative to this group and to seek their advocacy by providing them with short, easy-to-read stories that emphasise the contributions of University Science.
- Research from 25 Universities has now been featured, and 70 researchers and graduates have been profiled throughout the various issues.
- The magazine readership is surveyed regularly to seek their feedback on the publication and to develop a snapshot of who is engaging with the content. The readership includes Industry, Government, Research, Education, University, Journal Publishers, Board Members and Advocacy Organisations, with the largest group being in Education. A significant fraction of this latter group would be part of the audience that Refraction Media has developed through the Careers-in-STEM platform, which involves high-school teachers and careers advisers who are seeking relevant content to help advise their students on career options.
- One of the key challenges is to develop regular content updates, to ensure that the website remains

fresh and topical. Future topics to be featured might include space futures and food, together with more profiles on our graduates and new leaders who are emerging from University Science.

Sally-Ann Williams – CEO, Cicada Innovations

Cicada Innovations is an Incubator hub, based at Redfern (Sydney), that was formed through a partnership between four Universities – ANU, UTS, UNSW and Sydney. It has led to the creation of over 300 "deep-tech" companies to validate, commercialise and scale high-impact technologies globally within the broad areas of "Med-tech", "Health-tech", "Ag-tech", "Food-tech", clean energy, AI, Manufacturing 4.0, etc. These companies have been associated with the creation of over 3,000 STEM jobs. Prior to joining Cicada Innovations, Sally-Ann worked for Google. She discussed some of her insights around communications, consistent messaging, and University Science collaboration:

- Cicada's role is to act as a "melting pot" of ideas from Universities, Industry, Entrepreneurs, and community. They released an impact report in August 2020 to celebrate their 20th birthday, which reframed the narrative around Australia's deep-tech future and its capacity to drive economic transformation in Australia.
- A core element of her operating philosophy is that you never succeed in a vacuum and you never succeed alone. It takes an entire ecosystem to support a start-up.
- Sally-Ann used the establishment of the National Curriculum to demonstrate the importance of a shared vision and shared values to achieve an outcome that might not have been possible if the key participants had retained their traditional silos. She then used this as an example of one of our key challenges for University science, which is to formulate a sector-wide collective vision and set of shared values for University Science that our stakeholders can all share. Articulating that vision and developing a consistent narrative is critical – and we are not there yet!
- Underpinning any sector-wide development of a shared vision is a consistent set of values that will describe how we work together – how we'll collaborate; how we'll compete; how we'll treat each other; etc.
- Collective impact, which "dovetails" with vision and values, recognises that when one person is winning, we are all winning – together with the need to publicly celebrate those individual success stories. The example that she provided was the announcement of Cathy Foley as our new Australian Chief Scientist; her success is a win for the entire sector. In our context, this means that we do not simply celebrate successes within our own teams or science Faculties, but we celebrate science successes wherever and whenever they occur. In the context of our Australian University Science Magazine, this means that we need to ensure that people such as Sally-Ann receive copies of all of our publications so that she can celebrate the stories about University Science within her network. She is part of our advocacy network.
- The importance of a shared narrative was also emphasised, particularly when we are attempting to drive change. This is particularly important when the issues that we are trying to change are outside our direct sphere-of-influence, with an important example being our attempts to lobby Government around policy areas such as the Job Ready Graduate Bill (for example). Without a shared narrative and consistent, sharp messaging, it is much more difficult to influence those who do exert direct control. The elements of our narrative also need to be "relatable" – for example, our stories about the impacts of University Science must enable our audience (be it MPs, academics, members of the community, etc) to identify with, and relate to the content.
- Her final request to us is for University Science to articulate a "shared vision" about the work that we are doing individually and collectively, so that she can advocate on our behalf within her network.

Tony Peacock – CEO, CRC Association

Tony has recently retired from the role of CEO of the CRC Association after a tenure of 10 years. He is a Fellow of ATSE and Adjunct Professor of Applied Ecology at the University of Canberra. His presentation focussed on the importance of credibility and credible stories in promoting science in general and University science in particular:

- Tony began with a story about the World Health Organisation. The WHO is currently celebrating the eradication of smallpox, which was certified by Professor Frank Fenner, an Australian virologist based at the ANU, over 40 years ago. The cost of the eradication effort was $US300M, which the US alone recoups every 26 days since there is no longer any need for them to deploy medical resources to treat the disease. This is an important reminder of the value of science, and the need to have credible stories such as this to promote the value of science.
- It is important to promote science in a credible manner, to ensure that "sensible science", which is required to overcome challenges such as the COVID-19 pandemic, will be recognised, accepted and adopted by Governments.
- The CRC Association publishes a regular magazine called Collaborate Innovate (originally known as KnowHow), which was created to enable the CRC Association to engage State-based and Federal Politicians with their stories and messaging. On average, every Federal and State election in Australia changes the membership of the respective parliaments by up to 30 %, with the new parliamentarians having a range of initial views that can be influenced and modified by credible narratives in publications such as "Collaborate Innovate" .
- Using credible economic modelling to illustrate the boost in GDP that has been achieved through the work of the CRCs has been a particularly powerful tool, with the audience in this case (and hence those to whom the narrative should be addressed) being Treasury Officials.
- In developing their magazine with Refraction Media, Tony's perspective has been that it is really not that hard to capture people's "brains" through credible stories. However, with politicians, it is equally important to capture their "hearts" as well, given the pressures that they are under to fund a broad (and sometimes conflicting) set of initiatives. It is not that difficult to articulate a credible economic case for science, but the challenge is to ensure that it is at the forefront of their thoughts when they are making funding decisions.
- There is an advantage in having a paper-based magazine that people can read at their leisure – over lunch, in airport lounges, etc.
- Repetition is an important element in reinforcing our messaging, as is demonstrating the connections and links between an investment in science and societal outcomes.

Questions and Comments from the Floor

- Reiterating the importance of stories and storytelling: MPs need stories that they can relay in parliament to direct and sway opinions. In the US, one can often find magazines from local Universities, Institutes and National Laboratories in coffee shops, for example, and it is incumbent upon us to ensure that our Australian University Science Magazine is also available in such locations.
- We need to bring science to the forefront of peoples' minds. Our vision needs to be "measurable" and "memorable" and not necessarily "fancy" to engage with the community. Telling stories from the heart in an authentic manner is key.

- Our students – particularly our HDR students – are an important element of our messaging that we often neglect. We need to consider how we might involve our students in the story-telling and narratives that we need to engage with our stakeholders. The importance of including our undergraduate students in the storytelling was also emphasised, together with their contributions to Australian Science.
- We need to continue thinking strategically about our messaging and obtaining professional help in establishing the elements of our narrative. Engaging Refraction Media has been an important step for the ACDS, and one that we should celebrate.
- Should we be working in partnership with STA in building our narrative and engaging with our stakeholders? It was pointed out that STA represents Australian Science overall, and their focus is not on producing a definitive vision for University Science. We require a single, coherent vision for University Science that amplifies our own messages and crystallises a consistent narrative.
- The Federal Government is attempting to separate the funding of University Science from the funding of Education more broadly. Supporting the long-term trajectory of research in an environment where short-term perspectives are shaping the sector is a critically important issue. We need to embed the need for the long-term perspectives in our storytelling and ongoing narrative.

Session 2: Opportunities for University Science to Engage With and Win Support from Industry

Professor Peter Klinken – Chief Scientist, WA

- Peter is WA's third Chief Scientist and when his current contract ends, he will have been the State's longest-serving Chief Scientist. He began his presentation with a brief description of his role and emphasised that he is not part of the "political system" or the public sector. He is an advisor to Government and provides frank and fearless advice.
- When he entered the role, there was no State strategy around science and innovation. Since then, he has developed a strategic framework that builds explicit connections between Industry, Government, Academia, and the broader Community. A key aspect of this involves exploiting WA's comparative advantages to benefit the State.
- The energy transition towards renewables presents some unique opportunities for WA, given that it is home to massive amounts of sunlight, together with a capital city that is the second "windiest" in the world. It is also the only jurisdiction in the world that has all of the chemical elements and minerals required to fabricate Li-Ion and V-Ion batteries (Li, V, Al, Mn, Zn, Ni, Co, Fe and graphite), which presents significant opportunities for the State to play a central role in the transition away from fossil fuels. There are also opportunities around hydrogen production.
- This is a unique moment in time for Australia, given our comparative advantages, and we are incredibly well placed, if we have the wisdom, foresight, and intestinal fortitude to grasp the opportunities rather than being complacent. The COVID-19 pandemic has exposed issues with our supply chains and the need to build and enhance Sovereign Capability has never been as important.
- These comparative advantages also build on our incredible strengths in the Education sector. We are one of only three countries that has seven Universities in the world's top 100 Institutions, and our

sector has generated the third highest income for Australia, after coal and iron ore. It is incumbent on all of us to maintain that strength, so that we can act as an "engine room" to continue building Sovereign Capability for the future.

- Peter also made the point that WA could not exist in its current form without desalination. In the last generation, 95 % of the State's drinking water came from dams. With reduced rainfall over the past decades, only 5 % of their potable water is now sourced from dams, with 60 % obtained via desalination and 35 % from aquifers. The latter source is under significant threat due to reduced recharge rates. Hence renewable energy and water need to be considered together in WA, with the former being instrumental in the production of the latter through increasing desalination capacity.

Professor Caroline McMillan – Chief Scientist, SA

- Caroline commenced her role as SA's Chief Scientist in 2018 after serving as the University of Newcastle's VCP for seven years. In her former role, she was instrumental in the transformation of Newcastle from a declining steel city into an economic innovation centre by strategically engaging the University with Industry.
- Australia has been late in recognising the importance of research, investment in R&D, and innovation in driving economic transformation to support our economy. However, the need to address the productivity challenges associated with transforming from a commodities-based economy to an innovation economy are now front-and-centre.
- SA has begun to apply the lessons learned in other countries and jurisdictions to transform its economy and has identified key industry sectors that will be prioritised for investment. These include STEM-related sectors (agriculture, defence, space, energy and mining, high-tech industries) and Creative Industries. The EXCITE strategy has been formulated to link the STEM-related sectors, which harnesses ***EX***cellence, ***C***ollaboration, ***I***nnovation, ***T***ranslation and an ***E***nabled future workforce to build the State's economy through prioritisation of the STEM/innovation value chain. The State's investment in R&D is around $2B per annum, which is around 1.9 % of the GSP. This is the second highest percentage in Australia.
- Caroline advocated the use of well-established OECD metrics to assess the health of our innovation ecosystem and to map the key pressure points in the collaboration, innovation, and translation chain. The OECD metrics include citation impact, collaborations (between academia and industry; with international partners; etc). It is not the "quality" of the work being done that is assessed, but rather the "connectedness" of that quality. Achieving scale is an important challenge that needs to be addressed to attract investment from Government and Industry. Input-output measures are used across the OECD to assess the health of the research and innovation system and similar metrics are being used in SA to adjust the strategy as it rolls out.
- We need to move away from short-term perspectives that focus on funding relatively small initiatives and recast our thinking around a longer-term perspective that focusses on investment. This also requires us to consider priorities and the return-on-investment, for Government, Universities, and Industry. This is a key issue, and is the difference between involvement in (a) a project that might attract a one-off investment; as opposed to (b) the longer-term innovation journey.
- The Federal Government is just beginning to see the importance of these ideas, as evidenced by the recent release of the National Manufacturing Strategy in October. However, key questions posed by Caroline include: Are we ready for this culturally? Is our Leadership ready? Is our partnership strategy correct? Do we have a shared view of the areas in which we should invest?

Professor Hugh Possingham – Chief Scientist, Qld

- Hugh commenced his role as Qld's Chief Scientist in 2020, following a distinguished (and ongoing) career as an ecologist.
- For the past 20 years, Qld has had a strong innovation strategy that grew out of the work of the Beattie Government in creating the Smart State strategies that connect research in Universities to Industry, together with substantial investment in key partnerships between Academia and Industry.
- To illustrate the importance and value of partnerships, Hugh highlighted a recent invitation by Griffith University to help launch a new initiative between GU and Gilmore Space Technologies. Gilmore is a Venture-Capital-backed Australian rocket company that is developing a capability for launching small satellite payloads into space and plans to launch their first satellite from Australia in 2022. The important feature of the partnership between Gilmore and GU is the speed with which it was formed, based on significant trust, minimal bureaucracy, and co-location. The partnership enables scientists to move freely between Academia and Industry. Co-location, speed and trust underpin the success of the partnership. Such partnerships should be promoted, supported, and celebrated by Deans, DVCRs and VCPs, with Deans playing a key role in brokering such relationships.
- Most of the success stories out of Qld begin with individual scientists, who are trusted by their Industry partners (e.g. development of the Gardasil vaccine). Such relationships build slowly, and it is important for the same people to be involved over sustained periods of time with consistent messaging and trust. This is an approach that has worked well in places such as Imperial College London, where senior, exceptional academics are given carriage over establishing and maintaining relationships with key Industry partners.

Questions and Comments from the Floor

- ***Question to Peter****: How do we exploit the natural advantages that we have in WA in minerals, mining, etc? What is the greatest barrier to realising the vision that he outlined?*

  Peter responded by saying "vision, clarity, leadership" are the key elements. We have all of the building blocks in place, but they have not yet been assembled in a cohesive, long-term narrative. We are unbelievably well-placed. He mentioned a book by Ross Garnaut entitled "Superpower – Australia's Low-Carbon Opportunity", which provides a compelling economic rationale for Australia to become involved in this journey. Peter Beattie's leadership in transforming Qld by providing clarity and a vision for where the State could be, and then taking it there, is an example of what can be achieved by leadership and a clear, compelling narrative.

- ***Question to Hugh****: It can take a long time to build trust between Academia and Industry, and that trust can be destroyed in seconds. What is your view around succession planning if key personnel move on?*

  Hugh responded by indicating that time is required for successful handovers, that do not lead to a diminution in trust.

- ***Comment to Caroline****: Taking advantage of the strategies outlined by Caroline would, in many cases, require co-location of Industry and Academia. One of the key advantages of such an approach would be the exposure of students to the opportunities provided by careers in Industry (as opposed to academia)*. Caroline spoke to this idea at length and emphasised the importance of engaging the students in the relationships and culture to help them understand all sides of the conversations. The

idea of Industry Doctoral Training Centres is one approach that can work, where HDR students are exposed to both Industry and Academic environments, and the all-important intersection between them which will drive the various transformations that she outlined in her presentation.

- ***Comment to all**: We need people with good Industry and Political "knowhow" within our Institutions to be the ones who interact directly with specific Industry sectors. Such people in academia are comparatively rare, but they do exist. It is critically important to recognise who they are and to nurture them*.

  Hugh responded by indicating that it is important for senior academics to shift from a "me me me" perspective to one where their focus is on potential benefits to students, junior academics, and the broader Institution. He also commented on the possible need for mentoring and training programs in this area to help our mid-level and senior academics adapt to the need for a change in focus as their careers mature.

  Peter added that we are currently operating on a model that enshrines the same discipline silos within our Institutions that have been in place since the 19th Century. The challenges that confront societies when they are forced to adapt to significant disruptions (such as those we are experiencing at present) require a similar level of disruption to our siloed approaches and the underlying bureaucracies. There are significant opportunities ahead if we are prepared to grasp them.

- ***Comment to all**: Recent reports suggest that the majority of Industry investment in Australian Universities is currently directed towards mathematically- and computationally-intensive areas (including data science, cyber security, and some of the physical sciences). However, these are areas where we often struggle to recruit students, and the recent Job Ready Graduate Package will only worsen this pipeline situation across the nation. How can Schools, Universities, Chief Scientists and Industry, who all rely on this pipeline, work together to "fix the pipeline" and undo some of the damage that we are already starting to see as a consequence of the passage of the Job Ready Graduate Bill*?

  Peter responded by saying, once again, that our education system is operating on a 19th century model, and we need to move into the 20th century (if not the 21st) before we can properly adapt our systems to respond to these issues. An education system that is integrated from Prep. to Year 12 and into the tertiary sector as well is required. A recent Harvard report indicated that during periods of great technological change, education struggles to keep up with the pace of that change. When you have gaps between such technological change and the capacity of our education systems to adapt, the outcome is social "pain", and that is what we are experiencing now. This is a major societal issue, with societies fracturing around the world. Again, we need a clear narrative around these issues that the general population can understand, and then we need the leadership required to effect change.

  Caroline added that, to a very real extent, we are the authors of our own misfortune. We have not done a good job of engaging the broader community with science. Indeed, many people remember the problems that they experienced as school students in mathematics and science, and these experiences still (negatively) colour their perceptions as adults – and more importantly, as influencers around the career choices and aspirations of their children. We need to make science relevant and important in people's lives, so that they understand the impact and return-on-investment. In addition, changing the pathways into our science programs is critical, so that we do not just capture Year 12 students, but also mature-age students who bring different perspectives and experiences into the system. The importance of co-location was also emphasised, once again. For example, co-locating medicine and engineering completely changes the dynamics of their interactions and the outcomes that can be achieved. The way in which we package our degree programs and build the connections between them is an issue that we need to look at more closely. Finally, she mentioned a report entitled "*Inflection Point: Supply, Demand and the Future of Work in the Pittsburgh Region*", which describes the evolving transformation of work in the Pittsburgh region (a rust-belt to "brain-belt" success story) and its implications for employers, educators and workforce talent.

- ***Comment to all****: Changing the culture within our Institutions to adapt to many of the lessons that have been imparted today will be an interesting and compelling challenge. In 2020, we have successfully adapted our teaching to meet the significant challenges and impact of COVID-19, although we know that the Government will now be expecting us to do even more with less*.

  Peter responded by indicating that one of the most powerful (and cost-free) steps that we can take immediately is to change our narrative. For example, there are core competencies that employers are crying out for at present – problem-solving, critical-thinking, analysis – all of these are transferable and independent of discipline area.

  Hugh agreed, and emphasised once again that more co-locating and more joint appointments would be additional approaches that he would advocate. He suggested that this is the time to consider co-locations.

Session 3: Breakout Discussion: Promoting Industry Engagement – Opportunities and Threats

Group 1 – Cristina Varsavsky

- Several people in the group were not aware of the Australian University Science magazine, and we need to look carefully at the distribution list for the publication.
- It is very important to engage our ECRs and HDRs in science communication as part of their training.
- We need to ensure that the skills gained by our science graduates are highlighted in the magazine.
- The differences between the ACDS magazine and other publications such as Fresh Science were not always clear. We need to ensure that our membership understand the purpose of the ACDS publication.
- Industry engagement – the need to reflect on our approaches and culture is critically important.

Group 2 – Brian Yates

- Opportunities to engage with Industry – structures and people are key. The idea of having a single contact point between University and Industry is also important, although we still need to harness the networks across our Faculties. The seniority of the person acting as the single contact point is much less important than their skills set; you need to ensure that you have the right person for the role, irrespective of their academic seniority.
- Customer Relations Manager (CRM) software does not work well for the types of relationships that we need to establish and harness.
- Physical campuses – how can we exploit them to engage with Industry? The example of Wollongong's Innovation Campus was highlighted, although such an approach does require additional investment. Having a Head-of-Campus responsible for Industry engagement at each of our physical campuses is another possible approach, particularly where the academic functions of individual campuses in multi-campus Institutions are differentiated (e.g. Agribusiness engagement at one campus; manufacturing at another; etc). University Technology Parks, where multiple businesses might be co-located was another potential approach for developing productive partnerships.

- A link to UoW's Industry Research Engagement initiatives was also highlighted – see https://www.uow.edu.au/industry/industry-research-engagement/#d.en.49328

Group 3 – Melissa Brown

- How do we know if the ACDS Magazine concept is working for us? Would it be possible for Refraction Media to map our impact? Could STA help us to identify our impact? Should we be targeting the magazine at parents and prospective students as well as Government and Industry? Making our magazine accessible to such a wide audience was highlighted as a challenge.
- Open Days – reflecting on conversations with parents about career opportunities in science for their children led to the suggestion that we should consider a "Graduate Futures" issue of the ACDS Magazine in the future (perhaps published during the University Open Day "season"). This should be "agnostic" to specific Universities and outline the national career landscape for science graduates – as such, it would be a useful resource for all of us. We could also include a series of graduate stories from some of our Institutions to highlight the range of career opportunities for graduates and associated value to society.
- Industry engagement –mutually beneficial partnerships and promoting the benefits to both sides are key. It cannot simply be a one-way street. An important element of the discussion was around collaborations and partnerships. For example, since we can no longer travel internationally, should we consider taking sabbaticals with Industry partners?
- What Universities expect from their academics is also an important issue, and we must ensure that University reward systems value the relationships that we establish with Industry, including the development of appropriate metrics for assessing these relationships.
- During the discussions, a link to a "Careers in STEM" story was highlighted – see https://www.refractionmedia.com.au/careers-with-stem/.

Session 4: ACDS Graduate Innovation Forum (John Bartlett)

- See the attached presentation delivered on this topic.

Questions and Comments from the Floor

- ***Question to John****: Can we use the 3MT concept as a broader approach to engage our students? For example, as part of the selection process, could we pose a single problem for our students and ask them to develop a 3MT-type presentation around that problem as part of the selection process? This is one way to engage a broader audience of students than just the 24 who will be selected.*

  John indicated that this was an excellent idea, and one that we will consider as part of our planning for the GIF.
- ***Question to John****: The GIF will require a significant time commitment from students and others. The challenges will be to ensure that the supervisors who regard their HDR students as "cheap labour" are prepared to facilitate the involvement of their students in the GIF. We should consider driving this*

initiative through student organisations (i.e. bottom-up) rather than from the top-down, given the obvious value of the GIF in opening up career options for the students

John indicated that this was an important point to consider. We have already taken steps to minimise the workload on academics, although we will be expected a reasonable commitment from the students. A “coalition of the willing” has already been assembled to help organise the GIF, which involves our partners at ANSTO and AINSE who will be delivering workshops on “Science Communication” and “Pitch Delivery”, for example. It was further indicated from participants that addressing the issue of student participation is best achieved by simultaneously employing bottom-up and top-down strategies.