

*Australian innovations
making an impact*



Building Australia Through Innovation

Bionics Institute White Paper



17 March
2023

The Bionics Institute leads the world in the research and translation of innovative medical devices and therapies that improve human health.

We have an impressive track record of translating medical device concepts into clinical reality, dating back to 1986 when The Bionics Institute was founded by Professor Graeme Clark AC, who led the Australian cochlear implant research team.

Since then, the Bionics Institute has created three spin-off companies, including: Epiminder, DBS Tech and Neo-Bionica; and has a range of projects in the commercialisation pipeline that are set to change the lives of people with challenging conditions, including: Alzheimer's disease, hearing loss, tinnitus, rheumatoid arthritis and Crohn's disease.

Acknowledgements

The Bionics Institute would like to thank the following for their contribution to this White Paper:

Mr David Thodey AO
Mr Robert Klupacs FTSE
Ms Kylie Walker
Dr Jill Freyne
Dr Erol Harvey FTSE

The contents of this White Paper are based on the Bionics Institute's Med Tech Talks Podcast series and the Bionics Institute 2022 Innovation Lecture. We would like to thank the 2022 Innovation Lecture sponsors:

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CSL

synchron

Foreword



“Innovation is not a moment in time... It takes years of work and discipline and bringing ideas together and turning them into reality.”

/ David Thodey AO
Board Director

I am pleased to introduce this White Paper produced by the Bionics Institute, which has been such an important organisation in driving Australian innovation.

Innovation is fundamental to any nation, and any organisation. It enhances the lives of individuals and whole communities, driving economic and societal value. It is the constant desire for improvement and finding new ways to solve problems or enable new solutions.

Australia is an innovative nation, but much of the focus has been on innovation to support the resources and agriculture sectors. We now need to turn our sights towards the knowledge and service economies, innovating around technology areas such as med tech to build our economic, social, and environmental future.

National leadership is essential to bring this together.

We have deep capabilities across many professions and endeavours - but we have not been successful at consistent collaboration between academia, the private sector and government.

The med tech sector is a promising landscape for this to happen.

Public-funded research and development (R&D) has remained consistent in recent years and has been growing in line with our gross domestic product (GDP). Private sector investment in R&D has declined consistently over the last five years.

Our bigger challenge has been getting the private sector to step up to investing more in R&D and investing in new technologies and sectors.

The lack of diversity in our economy – driven by a well-placed reliance on resources and agriculture – has seen us drop in the innovation rankings.

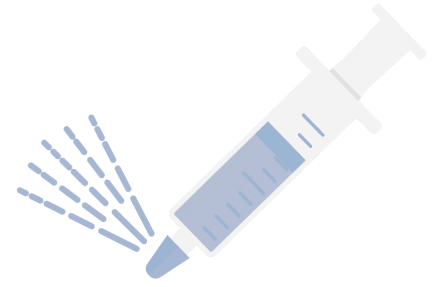
However, as a nation – with academia and industry working with government, and with the support of private investors – we can build a more diverse economy that supports new, world-leading opportunities for our well-educated and talented research community.

This will create new jobs and enable our economy to be more resilient to global market changes.

It has been pleasing to see how our academic institutions are becoming more externally focused, and the connection between R&D and commercialisation is improving.

The primary role of universities is to teach, of course, but along with that, the focus on innovation is extremely important.

Foreword *cont.*



So, we need to support our academic and privately funded research efforts.

We need more people out there saying, ‘try this’, ‘maybe this can work’, and to enable our researchers to freely move between private and academic institutions. We can improve how we commercialise our outstanding research efforts.

As a society, we need to celebrate our wonderful researchers more. Our scientists and innovators should be as well-known as our sporting heroes. We can be brilliant in the sports arena and in our laboratories.

We specifically need to promote our growing med tech innovation sector. We need to attract investment and encourage new students into this exciting career. That is why papers on innovation, such as this one, are so important to build awareness and attract investment.

As a nation we need a strong, long-term national vision to support the sector. A well thought through and long-term innovation policy framework is required.

Innovation policy involves aligning a complex set of variables. But if we keep improving and learning from those that have been successful, such as the triple-helix model from Europe, we will align our efforts and deliver real outcomes together.

I am optimistic about the future. It is about staying the course. Innovation is not a moment in time when you suddenly have a single breakthrough. It takes years of work and discipline and bringing ideas together and turning them into reality and, in the case of med tech, into something that changes lives for the better.

It is this process that we must continue driving and supporting to build a stronger Australia through innovation.

“I congratulate the Bionics Institute team for their leadership and wish them every future success.”



David Thodey is an Australian business leader with global experience and active in public policy. He is currently Chair of both Tyro Payments and Xero, a Director of Ramsay Health Care and active in a number of non-profit organisations. Previously, David was CEO and Executive Director of Telstra, CEO of Australia and New Zealand at IBM, and immediate past Chair of CSIRO.

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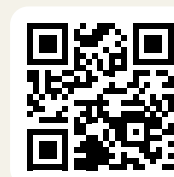
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Bionics Institute 2023 Innovation Lecture

When: 17 May 2023 | 17.15 arrival for 17.45 start

Where: RACV City Club, Melbourne

Networking: 19.45 - 21.45



[Register now](#)

Executive Summary

In July 2022, the Bionics Institute launched its Med Tech Talks Podcast, where CEO Robert Klupacs talks to leaders, entrepreneurs, researchers and investors to explore the concept of innovation.

This was closely followed by the inaugural Bionics Institute 2022 Innovation Lecture with keynote speakers Dr Andrew Nash from CSL and Professor Tom Oxley, co-founder of Synchron.

This White Paper synthesises the stories, theories and recommendations flowing from these initiatives, to spark conversation and prompt policy makers and leaders in Australia to take action to realise the value of med tech innovation in Australia.

On a range of measures, Australia's business sector appears to be falling behind in the global innovation race.

Australia is ranked 25 out of 132 economies for innovation system performance, behind New Zealand, Ireland, Norway, Malta, Estonia and many others in the [Global Innovation Index 2022 Report](#). We are ranked 19th in the International Institute for Management Development (IMD) [2022 World Competitiveness Rankings](#).

However, Bionics Institute CEO Robert Klupacs says he is optimistic that Australia can – and will – be a leader for med tech innovation because Australia has the fundamentals in place.

Nurturing a culture that is more tolerant of the journey is also vital. Australian investors have traditionally been more risk averse than many other countries. For example, on the path to create a new implantable device, Australian investors are more likely to want to see evidence that it works in humans. In the US, they're more likely to take the view that it's likely to work in humans and invest on that basis to get it to the human trial stage.

Kylie Walker, ATSE CEO, says the lack of consistent, strategic and concerted investment in translation, application and commercialisation of Australian research – and a fragmented approach to building the original knowledge itself – is holding Australia back from its full R&D potential.

Crossing the Valley of Death to translate ideas, research and innovation into patents and commercial products is one of med tech's greatest challenges.

As the appetite for investment risk and understanding of the journey grows, a disconnect between research and capital remains.

However, Dr Jill Freyne, CSIRO Deputy Chief Scientist, says the prize is huge: new jobs, growing new markets, and a strong, innovation pillar in our economy – a pillar of new opportunity built around new solutions and products that make life better and solve our greatest problems.

“On a range of measures, Australia's business sector appears to be falling behind in the global innovation race.”

In this White Paper, we propose four ways to supercharge innovation in Australia, with some stellar examples:

1. Co-location: Precincts and hubs

“You get an unfair advantage from co-location,” says Dr Erol Harvey, the Bionics Institute’s Head of Development and Research Translation and CEO of the ACMD. “It’s all around personal interactions. Being part of a community in a precinct, those conversations in coffee shops can lead to amazing things.”

2. Skills development and funding

ATSE CEO Kylie Walker says: “With manufacturing infrastructure and investment, a focus on lifelong learning and skills development, a steady and longer-term approach to investing in research and its translation, Australia can and will build a thriving and tech-forward manufacturing sector, alongside a world-class knowledge economy.”

3. Storytelling and persistence

Synchron CEO Associate Professor Tom Oxley says: “If you’re researching something and you think that you’ve seen an outcome of the research that could change the way that things are done, and you don’t quite know what to do with it or whether it’s real, you have to go out and talk about it. You have to put yourself out there.”

4. Leveraging mentorship and partnerships

“Big companies learn a huge amount from startups,” says the Bionics Institute’s Robert Klupacs. “We can move much faster than they can. Big companies have great expertise, but often they’re tied down by their own rigid bureaucracy.”

Lastly, we need to more accurately measure innovation, because what you measure, you can optimise.

A key topic of the next Bionics Institute Innovation Lecture in May 2023 will be to improve how we track Australian innovation indicators based on the Australian Government’s [Innovation Metrics Review](#), to support better decision making across the sector.

In the words of David Thodey AO, immediate past Chair of CSIRO:

“It is this process that we must continue driving and supporting to build a stronger Australia through innovation.”

The State of Innovation in Australia



“We need to keep both our brilliant people and the medical technology manufacturing here onshore.”

/ Robert Klupacs

Australian med tech innovation is a world leader – let’s realise its value

The true meaning of innovation can sometimes be lost, so freely is it bandied about.

At the Bionics Institute, we define innovation as the process by which new ideas and knowledge are converted into social or commercial value – or both.

Australia has everything in place to be one of the world’s leading innovation nations – a highly educated population, excellent infrastructure, leading universities and research institutions, a trusted regulatory system and enviable political and economic stability.

A long line of world-changing inventions have begun with Australian ingenuity. WiFi and the Black Box were both born on these shores, as were several critical med tech inventions, including the artificial pacemaker, the cochlear implant and one of the earliest foetal ultrasound scanners.

The science and research behind these inventions have helped build our economy, support competitive industries, create jobs and generally boosted the high quality of life enjoyed by most Australians.

While we are rightly proud of our reputation for punching above our weight in med tech innovation, we should also be regularly reflecting on whether we still are.

On a range of measures, Australia’s business sector appears to be falling behind in the global innovation race – as detailed on Page 18.

What should we be doing differently to support our brilliant researchers, scientists, engineers and clinicians in generating, developing and testing their new ideas?

How do we better realise the value of our innovation?

Seizing a golden opportunity

I am extremely optimistic that Australia can – and will – be a world leader for med tech innovation.

Minneapolis, St Paul – Minnesota’s twin cities – are widely regarded as the world’s leading hub for med tech, but the city of Melbourne is already in the top 5. Our job is to make all Australians realise just how close we are to being in the top 3 and even the number 1 or number 2.

We have so much talent and so much innovation. To lead the world, we need to keep both our brilliant people and the medical technology manufacturing here onshore, placing head offices in Australia, with marketing satellites around the world, rather than the other way around.

We have all the fundamentals. There is enough built infrastructure for manufacturing but it’s not being utilised well enough. There’s been a huge amount of early-stage innovation here, sitting and waiting to be supported. Unfortunately, some excellent innovation has atrophied.

In my view, we’re missing two ingredients for success in the sector: accessible long-term capital and experienced people with international management expertise.

By adding these additional pieces to what we already have, Australia can lead the world.

You only need to look at the med tech innovation that’s come out of Australia without those pieces: Cochlear, ResMed, Synchron, Seer Medical, Global Kinetics, LBT Innovations, WearOptimo, Ellume, are just a few of the many examples.

In the past five years the Bionics Institute – with an annual average annual budget of \$10m per annum – has spawned three companies with a combined market cap of more than \$270 million. And we are just one institute.

The Bionics Institute is located in the east Parkville Precinct, which is where the Aitkenhead Centre for Medical Discovery (ACMD) is located. Over the past 5 years, 15+ companies have come out of this precinct that are now close to FDA registration or going through clinical validation.



Robert Klupacs
CEO Bionics Institute

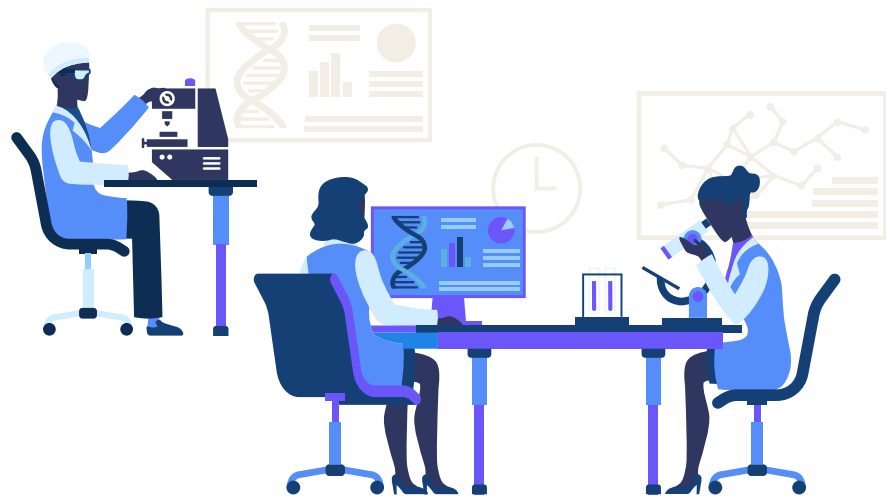
We know there’s also a wealth of early-stage IP and innovation that is seeking to be further developed just in our precinct, let alone other parts of Melbourne.

The funnel is so deep that – even with the inevitable failures, which is part of the innovation process – you can only imagine what can be achieved when we apply more strategic and cohesive purpose to this ecosystem.

As we have seen with Cochlear and ResMed it only takes one or two of them to make the difference for Australia.

Robert Klupacs is scientifically trained in pharmacology and biochemistry. He is also an Australian-registered patent attorney with extensive experience in private and publicly traded companies as well as academia. He has been involved in the successful commercialisation of pharmaceuticals, diagnostics, software, scientific instrumentation, food technologies and agricultural technology. He has unique skills in translating and commercialising early-stage intellectual property into products or investable corporate vehicles.

Innovation Challenges



“We could and should use more comprehensive metrics and scorecards to capture innovation activity.”

/ Kylie Walker

What’s working in Australian innovation and what we could do better

There’s no doubt that Australian med tech innovation has already given us much to celebrate, with success stories from the sector that are household names around the world, benefiting society, community and creating jobs.

What begins as an idea is nurtured by investment to translate that spark into a commercial outcome – and a med tech invention to improve lives. If we were to pick three areas of focus that would lead to a more robust med tech ecosystem in Australia, it would be capital, accelerators, and a bigger appetite for ‘failure’.

It’s vital for both investors and the Australian public – whose taxpayer dollars are part of the available capital – to realise that many innovations won’t make it, and to understand why.

Sometimes, the product isn’t quite right or there isn’t a market. It’s vital to find that out, and accelerator programs working on a ‘fast fail’ model are an essential part of a healthy innovation ecosystem. Accelerators are growing in number around Australia, which is encouraging. They are an invaluable step in helping the innovators – researchers, scientists, engineers and clinicians – to learn and move on. Finding out early what’s not going to fly accelerates success – just as it says on the tin.

Nurturing a culture that is more tolerant of the journey is vital. Australian investors have traditionally been more risk averse than many other countries. For example, on the path to create a new implantable device, Australian investors are more likely to want to see evidence that it works in humans.

In the US, they’re more likely to take the view that it’s likely to work in humans and invest on that basis to get it to the human trial stage.

Over the past decade, we have seen a growth in venture capital funding and angel investors in Australia who are willing to invest in riskier med tech innovations. Accelerators speed up discovery, but capital must nevertheless be patient. To ensure devices are safe and effective, med tech development takes a long time. It can take 5 to 10 years to get a product from prototype to market, with clinical trials starting small and gradually growing.

The trade off in terms of improving the lives of patients is amazing – just look at Professor Graeme Clark’s cochlear implant invention. This bionic ear has now been implanted in almost a million people.

Powering Australian innovation

For a small nation, Australia produces an astonishing amount of new knowledge. Breakthroughs by Australian researchers have revolutionised humanity's understanding of science as diverse as microbes, major disease, climate change, and the origins of the universe.

But a lack of consistent, strategic and concerted investment in translation, application and commercialisation of Australian research – and a fragmented approach to building the original knowledge itself – is holding Australia back from its full R&D potential.

Schemes such as the Medical Research Future Fund (MRFF) work well to support commercialising Australian research, but nationally, investment in knowledge creation and application is slipping.

Over the long term, we are eroding our supply of potential commercialisation, and losing top brains to more stable and friendly R&D funding environments internationally.

Investors across all sectors have appetite for start-up risk and Australia is building a strong start-up community, but here, too, we are letting ourselves down.

Until we have a strong modern manufacturing sector, with the infrastructure and capital to manufacture at scale on-shore, we won't be able to move past the start-up stage.

To build an effective innovation strategy that supports Australian R&D to thrive and build domestic economic capacity, we should start with what we know about ourselves.



Kylie Walker

CEO, Australian Academy of Technological Sciences and Engineering (ATSE)

We could and should use more comprehensive metrics and scorecards to capture innovation activity and align our definitions of innovative businesses with those used internationally.

We need to invest in workplace learning to support businesses to develop and deliver training for priority areas for an innovation economy, and we need to continue to support collaborative enterprise, in which the universities sector and industry work together to commercialise and apply great Australian research.

With manufacturing infrastructure and investment, a focus on lifelong learning and skills development, a steady and longer-term approach to investing in research and its translation, Australia can and will build a thriving and tech-forward manufacturing sector, alongside a world-class knowledge economy.

Kylie Walker specialises in connecting technologists, engineers and scientists with governments, business, media and society – skills built over many years in senior federal communication and advocacy roles in science, technology and health sectors. As CEO of ATSE, she works with expert Fellows to lead crucial national conversations and strategy towards a thriving, healthy and connected Australia supported by technology.

Bridging the Innovation Gap



“It takes a culture that creates an appetite in industry to invest in innovation and see it as critical to business strategy.”

/ Dr Jill Freyne

Bridging the gap between med tech innovation and commercialisation

Crossing the valley of death to translate ideas, research and innovation into patents and commercial products is one of med tech’s greatest challenges. In Australia, it is one of the most yawning gaps in the sector.

Successfully bridging it will keep the value – in both monetary and human terms – of our many innovations here in Australia. It means fulfilling jobs for scientists and engineers, and the many other roles around research translation – lawyers, developers, builders, marketing experts, journalists.

Despite our med tech successes, Australia has a long history of seeing discoveries that were born here being commercialised overseas. As previously discussed, local funding has been part of the challenge. As the appetite for investment risk and understanding of the journey grows, a disconnect between research and capital remains.

As Synchron’s co-founder Associate Professor Tom Oxley asked in his talk at the 2022 Innovation Lecture, “The challenge is, how do you put the entrepreneurs in front of the money?”

Associate Professor Oxley sees the BioDesign Innovation program at the University of Melbourne, a multidisciplinary approach to innovation run by Professor David Grayden, as an exciting leap forward.

Teams have a minimum of two engineers and two MBA students and spend the first six weeks in a hospital, looking for unmet patient needs. To date, 22 teams have each created a prototype device and more than half of the alumni teams have formed startup companies to try to commercialise their med tech innovation.

The one-year course covers funding, IP, regulatory requirements and the all-important reimbursement model. This pairing of researchers and engineers with business students is a growing trend: other Australian universities have similar programs in place and have formed Biodesign Australia, a network to share resources.

It’s a live opportunity to change the way med tech innovation is nurtured in this country, from ideation to commercialisation.

Building a robust innovation eco-system

Australia urgently needs to build a robust innovation eco-system so we can launch ideas across the so-called valley of death and into commercial reality. The prize is huge: new jobs, growing new markets, and a strong, innovation pillar in our economy – a pillar of new opportunity built around new solutions and products that make life better and solve our greatest problems.

That's why this conversation is so important. That's why we need to talk about and think about why our scientific research is often world class but too often we lose our best ideas to be commercialised overseas.

That's why we need to build an innovation eco-system powered by industry engagement, government investment, venture capital and world-class research that all come together to form bridges across the valley of death.

We need to change that, and urgently, but it takes more than just investment.

It takes a strong, diverse and robust innovation eco-system that can shepherd scientists and entrepreneurs to the other side of the valley of death.

It takes a culture where science can pursue big, bold research free of legacy thinking as well as targeted solutions to real world problems.



Dr Jill Freyne
Deputy Chief Scientist
CSIRO

And it takes a culture that creates an appetite in industry to invest in innovation and see it as critical to business strategy, and not just a nice to have.

A strong innovation eco-system is also broader than just research and industry. It needs leadership that invests in big ideas, sets clear expectations about direction as well as investment and a venture capital community with a healthy appetite for risk, based on an understanding of how science and technology operate.

We need all of these things working together to create an environment that inspires the next generation of scientists and creates opportunities for them to pursue challenging, exciting careers in science and technology.

Dr Jill Freyne is Deputy Chief Scientist at CSIRO, Australia's national science agency. CSIRO solves the greatest challenges through innovative science and technology.

A highly experienced leader in digital health service delivery, Jill is recognised in Australia and internationally for her work in transformative health technology solutions. She is passionate about improving equity and accessibility in the healthcare industry and has extensive experience in leading teams to devise sustainable health innovations.

Four Ways to Supercharge Innovation



Co-location: precincts and hubs

“We need to build this ecosystem here,” said Dr Andrew Nash, Chief Scientific Officer with CSL, in his keynote address at the Bionics Institute 2022 Innovation Lecture.

“It’s about scientists coming together with industry, and patients and treating physicians and investors, and developing an ecosystem which can optimise the translation of our innovation.”

In a medical research precinct, said Dr Nash, “all the pieces of the puzzle overlap”, with physicians working with scientists and investors in the mix thinking about how to capitalise on the innovations. Boston, Cambridge and Minneapolis, St Paul are all such precincts. One of Australia’s booming med tech precincts is Parkville in inner Melbourne. It’s home to CSL, the Bionics Institute, St Vincent’s Hospital, the University of Melbourne, the Aikenhead Centre for Medical Discovery (ACMD) and many more institutions

Our digitally connected world means information can be shared instantly across distance and time zones, but it doesn’t afford the serendipity co-location brings.

“You get an unfair advantage from co-location,” says Dr Erol Harvey, the Bionics Institute’s Head of Development and Research Translation and CEO of the ACMD. “It’s all around personal interactions. Being part of a community in a precinct, those conversations in coffee shops can lead to amazing things.”

For Neo-Bionica, one of the Bionics Institute’s spin-off companies, co-location is an absolute boon. “Having manufacturing and prototyping capability embedded within a teaching hospital is unique,” says Dr Ludovic Labat, CEO of Neo-Bionica. “Daily, you share the lift with patients and nurses and doctors who may use your products in a few years. It influences all the small decisions that we make each day.”

Such co-location creates a level of connection and compassion for patients that an engineer working in an office remote from a hospital can’t possibly get, and also affords instant access to the network of clinicians and researchers.

“It’s a very special collaboration. We can have a clinician or surgeon come to our office in just 15 minutes to give us inputs about an unmet need they’ve seen, giving feedback on the design to our engineers and allowing us to know very early on how they are going to use that device. They can be back at their clinic by the end of their lunch break. I don’t know of another engineering service provider with such a proximity to the clinical world. It’s something really special.”

Aikenhead Centre for Medical Discovery (ACMD)

ACMD is Australia’s first collaborative, hospital-based biomedical engineering research centre, and is based on the St Vincent’s Hospital Melbourne Campus. Partners include: the Bionics Institute, Centre for Eye Research Australia, St Vincent’s Institute, University of Melbourne, RMIT University, Swinburne University of Technology, Australian Catholic University, and University of Wollongong.

Neo-Bionica

Neo-Bionica is a joint initiative of the Bionics Institute and the University of Melbourne that bridges the gap between research and the clinic. The company offers end-to-end medical device prototype development, from initial concept and rapid prototyping to pre-clinical testing and first-in-human prototypes for clinical trials.

Four Ways to Supercharge Innovation



Skills development and funding

A thriving ecosystem is thirsty for skilled workers – it’s a classic chicken and egg situation.

“One of the challenges that we see with the startup and SME end of the private sector – small R&D firms and small manufacturers – is they want the skills they need, but they are often unsure how to go about upskilling people on the team or acquiring new talent,” says ATSE CEO Kylie Walker.

“We really encourage work-study schemes – they can go a long way to supporting upskilling the existing workforce and also to bring people back in after a break. That’s a huge untapped resource – think about how many women have left STEM mid-career. That’s an enormous highly skilled workforce that could be brought back in with the right sort of support.”

Over the next seven years, ATSE’s Elevate scheme is offering 500 scholarships for women to study at an undergraduate, postgraduate or leadership level in STEM.

“We hope to grow that – 500 is a great start, but Australia is looking at a shortfall of 60,000 people in the STEM-skilled workforce,” says Ms Walker. “Depending on which report you read, that’s going to grow to either 300,000 or 1 million by 2030. That’s a huge number of people to recruit and train ... by far the easiest way to do that is by diversifying the STEM workforce.”

The other gap to plug to address Australia’s innovation lag is limited R&D funding and a lower appetite for risk among private investors for start-ups.

“The smarts are in Australia and we punch way out of our league given our size and our resources,” says Synchron’s Associate Professor Oxley, who nevertheless had to go overseas to raise capital with co-founder Professor Nick Opie.

“The investors who led our Series A and Series B had a bigger appetite for risk than any VC that I’ve seen in Australia,” he says. However, there are many elements on Australia’s side, he notes. “The R&D tax rebates are working really well, the first-in-human trials are fantastic, and the quality of clinical care is outstanding,” he says.

“There’s excellent science, but the essential peripheral pieces – manufacturing, pre-clinical ancillary staff, the alumni and the actual funding – need to come together. The ecosystem in the US, around Minneapolis, San Diego and Boston, has taken a long time to come together. Now we would love to see founders coming back to Australia, finding ways to raise capital, and VCs supporting locally bred groups. For us, Israel is the model.”

Melbourne Biomedical Precinct

The Melbourne Biomedical Precinct is made up of over 40 hospitals, research, teaching and biotechnology organisations – largely co-located to the north of Melbourne’s CBD – and is home to an exceptional network of skilled workers, quality education providers, leading research institutes and a sophisticated health system.

Elevate: Boosting Women in STEM

ATSE’s Elevate: Boosting women in STEM Scholarships provide financial support, but also address gender inequities in STEM by fostering more women-led industry-academia collaborations in applied research and business; and growing the professional skills of women in STEM to propel women into leadership.

Four Ways to Supercharge Innovation



Storytelling and persistence

Synchron specialises in brain computer interface technology. It was co-founded by Professor Nicholas Opie and Associate Professor Tom Oxley. Their innovation, the Stentrode, is a medical device – implantable without open surgery – that can pick up the electrical signals of thoughts in the brain from inside a blood vessel.

Users' thoughts are translated wirelessly through digital devices, designed to stimulate thought-controlled movement, and could well transform the lives of people who are paralysed or have restricted movement.

To say that Synchron's novel technology has been beset by naysayers is an understatement. Associate Professor Oxley says persistence, fortitude, resilience and self-belief have been essential. Equally important, Associate Professor Oxley and Professor Nick Opie say, is talking about it. A lot. In Tom's words: "If you're researching something and you think that you've seen an outcome of the research that could change the way that things are done, and you don't quite know what to do with it or whether it's real, you have to go out and talk about it. You have to put yourself out there.

People tend to be afraid, or they're paranoid or they think that, 'I've got this idea, but I'm not going to tell anyone because someone might steal it'. I've not seen anyone be successful starting out with that attitude. You have to put yourself out there. You have to reach out to people and see if you've got something.

You have to go and understand the reasons that might stop you from being successful with taking that idea forward. Once you've done that, you have a roadmap for what you need to overcome. When I first approached the University of Melbourne when I was still doing my PhD and said, 'I want to spin out a company,' I was told, 'You don't know how to run a company, you've never run it, you've never started a company, you don't have any money, you don't have enough patents'.

I was writing down everything they were saying. 'Tell me more.' We had a list of things we had to go and do.

Until you put yourself out there, how are you going to figure that out? You have to absorb it all; take from people the reasons why it might not work, and then go and solve those problems. You really have to throw yourself out there and be willing to embrace criticism and even ridicule.

Innovation is creating something new in a way which is needed and meaningful. You've found a different angle and a new pathway, and once it lands it's going to change the dynamics, change the way we think, change the way we behave. And you created that."

Synchron

Synchron is a leading implantable brain computer interface company, headquartered in New York with R&D in Melbourne. Synchron's Stentrode uses the brain's blood vessels to access and convert neural signals into commands for a digital device or machine to help people with paralysis and other neurological conditions.

Epiminder

Epiminder was set up by the Bionics Institute, University of Melbourne, St Vincent's Hospital and Cochlear Ltd in 2017, to develop an implantable monitoring device that has the potential to be a game changer in the treatment of epilepsy.

Four Ways to Supercharge Innovation



Leveraging mentorship and partnerships

The power of mentorship is an essential element in the innovation ecosystem. Role models make a huge difference in what we're trying to do at the Bionics Institute – and across Australia – to get people to think a little bit bigger, and to find the right people to guide them.

Mentorship should be seen as a two-way street – even the most experienced mentors report learning a lot and feeling an injection of fresh energy when they are working with young entrepreneurs. Being part of the creation of something new and potentially life-changing for patients makes med tech mentorship very special.

I encourage “people to learn by doing – there can be a tendency to say that the only thing that separates me from my perfect career is this course I haven't yet done,” says Dr Harvey. “People should surround themselves with experts, work with mentors and others and take the attitude that you're always learning.”

Associate Professor Oxley says “some people gravitate towards mentorship, and some do not”, and while he tries to coach his own team to look for mentors, he recognises it requires an openness that is hard to teach.

“But I can't stress enough how important it is to go and find a group of people that you can go to with your problems to help you give a new perspective,” he says.

Despite their work commitments, Synchron co-founders, Professor Opie and Associate Professor Oxley are committed to giving back to the biomedical community through tutoring, speaking and mentoring the next generation of scientists, innovators and entrepreneurs.

Like mentorships, the best partnerships are also relationships where benefits flow both ways.

“Big companies learn a huge amount from startups,” says the Bionics Institute's Robert Klupacs. “We can move much faster than they can. Big companies have great expertise, but often they're tied down by their own rigid bureaucracy.

“Nimble, smaller operations can do that and can help bring technology to bear much more quickly for the big companies, who in turn are sharing their experience and knowledge with early-stage companies about what it will take to get a product to market.”

COO of start-up DBS Tech, Dr Paul Minty says: “Innovation is disruptive and businesses and markets are meant to resist disruption. It is vital to leverage partnerships to accumulate enough demand and value to overcome resistance and get your innovation onto agendas, into budgets and into supply chains.”

DBS Tech

DBS Tech is a Bionics Institute spin-off company based in Melbourne, which was established in 2019 to commercialise technology developed to harness unique brain signals that enhance electrical stimulation treatments for a range of neurological disorders, including Parkinson's disease.

EarGenie®

Researchers at the Bionics Institute are developing a new hearing test that measures the brain's response to sound using near-infrared light to give information about discrimination of sound in early life, which ensures babies receive the best device to ensure the necessary hearing to learn speech.

Next Steps

What you measure, you optimise

A key topic of the 2023 Innovation Lecture will be to improve how we track Australian innovation indicators. Last year, the Australian Government published its [Innovation Metrics Review](#), to support better decision making across the sector.

The Review's aim was to develop a suite of metrics to better capture innovation in Australia, improving policy making, program design, and evaluation and overall decision-making.

Dr Erol Harvey was a member of the expert working group. "We wanted to look at how we were measuring relevant parameters in terms of innovation for Australia," he says. "One of the main findings was that there's a lot of innovation which is non-R&D, but the metrics are often skewed towards measuring R&D."

Its key recommendations were:

- Regular measurement of the Australian innovation system via a scorecard
- Better data and metrics for measuring innovation
- Ongoing analysis of the innovation system
- Leadership in innovation measurement via the appointment of a single entity to provide national reporting.

It's important for Australia to understand that we don't have to undertake to 'do everything ourselves', says Dr Harvey. "You need a clear understanding of the problem you're trying to address, what the solution would look like in terms of its success criteria, and then look at what you've got and where you can most effectively get the other bits that you need.

It's very easy for people to focus on what they don't have – and that stymies a lot of people from moving forward. It is about optimising the knowledge you have and collaborating to access the other things you need."

Dr Harvey says Australia should become a med tech manufacturing superpower. "Our geographic distance from major markets means that a high value per kilogram of manufactured product is ideal," he says. "This is why medical devices are so good – the volume of intellectual property and its value in a medical device is very, very high.

We can develop and manufacture these in Australia and ship to anywhere in the world and the shipping costs become a tiny component of the overall cost. We should position ourselves in excellence – we can't chase price, because we are a high-cost country to live in, so we have to be competing on quality and on value. When I founded MiniFAB, people would say, 'Aren't you afraid this manufacturing will shift to Asia?'

I didn't see it that way: Our competitors were in Switzerland, an even more expensive place to manufacture, but look at how good they are. Australia can be the Switzerland of Asia."

Bionics Institute 2023 Innovation Lecture | 17 May



After the success of the inaugural event, the 2023 Innovation Lecture will be invitation-only. The focus of this year's event is to bring med tech leaders together to explore how Australia can accurately measure innovation, boost the med tech ecosystem and strengthen connections.

Register your interest in attending: [Innovation Lecture 2023 - Bionics Institute](#)



\$1=\$3.90

Every \$1 invested in Australian medical research returns \$3.90 in benefits to the population, according to a 2018 KPMG report, [The Economic Impact of Medical Research in Australia](#).



80%

Early-stage funding in the Oceania region increased 80% between 2020 and 2021 with Sydney placed #1 and Melbourne #2 in the region, according to Startup Genome's [Global Startup Ecosystem Report 2022](#).



\$6.3

The Australian Government has announced the \$6.3 billion Medical Research Future Fund (MRFF) [2nd 10-Year Investment Plan](#).



25

Ranked 25 for innovation system performance out of 132 economies, behind New Zealand, Ireland, Norway, Malta, Estonia and many others in the [Global Innovation Index 2022 Report](#)

The International Institute for Management Development (IMD) World Competitiveness Ranking 2022 analyses and ranks the capacity of countries to create and maintain an environment which sustains the competitiveness of enterprises. More information: [World Competitiveness Rankings - IMD](#)

19

out of 63
overall ranking

16

out of 63
for economic
performance

19

out of 63
for infrastructure

*Innovation
for Life*



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