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| Australia Innovation Ecosystem |



Innovation & Impact

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Preface

Australia has one of the lowest levels within the Organisation for Economic Cooperation and Development (OECD) of public support for innovation, along with government-financed levels of R&D below the OECD average. From a high of 2.25% GDP in 2008, Australia's spending on research and development has fallen year on year. However, it is business investment in R&D where Australia really struggles. In the 2018 Global Innovation 1000 Study, the first Australian business was Telstra—ranked at 182nd on the list—with only three other Australian companies rounding out the top 1000. As a country, we need to invest further into R&D and embrace the innovation that comes with this. As independent innovation ecosystems, we need to communicate the benefits of investment into R&D to the everyday person and bring the general public along for the journey. We need to tell our success stories widely and loudly.

Knowledge Commercialisation Australasia (KCA), the peak body representing organisations and individuals participating in the commercialisation of publicly funded research in Australia and New Zealand, is proud to support the first Australian “Innovation and Impact” issue. For the first time, this is an attempt to bring together siloed innovation hubs from across Australia to highlight successes, failures, and the lessons learnt. We would like to thank the inventors, the technology transfer professionals, the entrepreneurs who have all contributed to the fantastic array of case studies in this report. Universities and researchers are a critical part of the value chain—the first idea, the key experiments, the proof of concept—but these stories highlight the importance of the team in ensuring that great ideas get out into the market. In the last ten years, Australia's start-up ecosystem has changed dramatically, with universities investing heavily in entrepreneurship and accelerator programs.

In fact, recent times have seen half of Australia's most active accelerators affiliated with universities—contributing close to \$100m in resourcing, infrastructure, and investment in these programs. There are still many challenges to overcome: developing sustainable funding models, recruiting high-quality mentors and facilitators, and ensuring that programs can adapt to different delivery modes. The case studies recounted herein highlight what can happen when driven individuals, with an inspired idea, are fuelled with the infrastructure and funds—plus maybe a touch of good luck and persistence along the way.

Dr Erin Rayment

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Chair, Knowledge Commercialisation Australasia

Opening Paper



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Australia's Innovation ecosystem over the last 20 years, Innovation & Impact 2020

URL: <http://iai.digital/2020/australias-innovation-ecosystem-over-the-last-20-years>

Australia's Innovation Ecosystem

Over the Last 20 Years

Peter Devine, Rabab Nasrallah and John Kurek

Abstract: Australian innovation ecosystem experienced a very dynamic transformation over the last 20 years. The article presents the keydrivers that brought this change and summarizes the main periods of that process: the investment landscape (2001-2005), the difficult times up to 2011 followed by the vital recovery between 2011-2015 and further growth till now. The article presents current landscape strongly affected by the COVID-19 that affects many businesses. Finally, a possible future scenarios are drawn and discussed.

Keywords: Australia, Cluster, Ecosystem, Innovation, Enterprise, Impact

1. The environment leading up to 2000

Back in 2000, Australia had been through a decade-long bull market, with mining and agriculture as the major investment classes. The dot.com bubble also meant technology was becoming more widely accepted as an alternative investment option. Australia's scientific research was already recognised as on par with the best in the world, so it made sense that it should produce some great commercial opportunities.

Despite this favourable backdrop, the Australian venture capital industry was still very immature. The Australian Government had backed the first Innovation Investment Fund (IIF) managers in 1998 with a \$200m investment, but there remained a low pool of venture funds—particularly for early-stage investments. At the time, early-stage venture capital represented just 1% of the Australian Gross Domestic Product (GDP) compared with 4% of GDP in the United States.

In addition to the IIF, the START grant scheme was in place, providing matching funding for investment to support the commercialisation of Australian research. There was also an R&D Tax Concession in operation, whereby R&D investment was 125% deductible—though only after a company became profitable.

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Despite this, technologies developed in Australian research institutes were not being funded to a significant extent. Put simply, Australian venture capital funds were not interested in university technology or seed-stage investment because it was too early and too risky. Research-based ventures had historically been poorly organised, had intellectual property that was poorly defined and managed, had high science and people risk, and needed intensive hands-on assistance. There was excellent Australian science, but virtually no assistance to commercialise it. The first university-focused fund in Australia, Uniseed, was established in October 2000 to bridge this gap. Initially, a proof of concept fund, Uniseed, was a \$20m partnership between the Universities of Queensland and Melbourne (UQ and UoM).

2. The investment landscape 2001–2005

In 2000, the dot.com bubble burst. The subsequent economic downturn saw the Federal Government introduce several initiatives that were critical for assisting innovation.

Four further IIFs totalling \$160m were established in 2001. That same year, the Government supported the establishment of four new Pre-Seed Fund (PSF) managers (totalling \$100m) that were designed to invest in companies spinning out from universities and public sector research organisations. The program had a significant positive impact on the availability of pre-seed funds in Australia—as both the first investors in new start-ups, and as follow-on or co-investors in already established start-ups.

Unfortunately, the PSF scheme was not renewed. The ethos behind the scheme was flawed in that it assumed that an earlier, riskier fund would make a significant return on capital over 10 years at a time when later stage venture funds in Australia had been unable to do so. Another disappointing aspect of the PSF scheme not being renewed was that several VC managers who had learnt the trade was lost. In addition, the IIF scheme was not supported again for many years—eventually being resurrected in 2007.

Other schemes, such as the introduction of the \$40m Biotechnology Innovation Fund (BIF) and Venture Capital Limited Partnerships (VCLPs), saw the pool of venture capital in Australia grow rapidly. From a level of \$230m in 1999–2000, capital levels reached \$478m by 2000–2001 and continued to grow in the subsequent years.

ANU Connect Ventures, a fund focused on the Australian National University and supported by MTAA Super, was also established in 2005.

However, despite the growth in VC funds, there were still limited funding options for early-stage university spinouts, and follow-on rounds were usually at or close to flat valuations due to the limited pool of capital. It was still a “buyer’s market”.

3. 2006–2010: A Near Death

In 2006, Uniseed closed what was Australia’s first Commercialisation Fund. The Superannuation Fund Westscheme and the University of NSW joined UQ and UoM to commit \$10m each over the next 10 years. Apart from a focus on seed investment, a unique aspect of

the operational model relative to traditional venture funds was an open fund structure, making investments throughout the entire life of the fund.

The Medical Research Commercialisation Fund (MRCF) was established in 2007, managed by Brandon Capital. In contrast to Uniseed, this fund was focused on Australia's medical research institutes, with each organization paying a modest annual membership fee. The fund received significant support from Federal and State Governments, and this allowed the MRCF to attract superannuation support due to its low fee structure for investors.

One of the biggest negative events for the innovation sector over the next decade was the collapse of Lehman Brothers in September 2008 and the onset of the Global Financial Crisis (GFC). Investment funding availability dried up considerably as funds moved away from riskier alternate assets and into safe havens.

Notably, the GFC came on the back of the axing of the Commercial Ready grant scheme in May that same year—CommReady being the grant scheme that effectively replaced the START and BIF schemes. This left many small growth companies in the difficult position of having to secure alternative private funding quickly, which was not an easy feat.

These events led to superannuation funds and other investors pulling back on venture investment, and the number of new venture funds formed subsequently decreased significantly. Fortunately, funds like Uniseed, ANU Connect Ventures and the MRCF were able to continue investing and ride out this tough period.

Despite this, the negative economic environment produced some positives. Following the resurrection of the IIF scheme in 2007, two further IIF managers were supported (a total of \$90m in capital). In 2009, the Federal Government provided further IIF funds and also introduced the Innovation Investment Follow-On Fund (IIFF)—a pool of \$83m made available to 20 venture managers to support companies after the GFC.

4.2011–2015: The Recovery

The introduction of the refundable R&D Tax Credit in July 2011 provided a further boost, with a 45% cash rebate on eligible R&D for non-profitable companies with turnover below \$20m. This has proved to be by far the most important scheme for start-ups as the relative certainty of the rebate means that start-ups can plan their budgets around this.

However, in 2014–2015, scientific research funding was cut to less than 0.6% of GDP, and the Government also commenced a reduction of the R&D tax credit from 45% to 43.5% in July 2016 and then cut again in 2018 from 43.5% to 41%. Further cuts were also proposed by linking the rate to the company tax rate, though this has been deferred until a later review.

On the positive side, changes were announced to the Significant Investor Visa Program in 2015 to mandate that \$500,000 of the \$5m investment application fee needed to be invested into alternate assets such as venture capital. The National Innovation and Science Agenda also set a focus on science, research and innovation as long-term drivers of economic prosperity, jobs, and growth, with \$1.1b committed over four years to 24 measures.

In 2014 and 2015, the mood changed considerably, following high-value deals such as Fibrotech Therapeutics (sold to Shire for US\$75m plus milestone payments), Spinifex Pharmaceuticals (sold to Novartis in a US\$700m deal), and Hatchtech (sold to Dr Reddy's Laboratories for US\$200m), which returned significant capital to shareholders.

Atlassian's IPO on the Nasdaq in December 2015—the largest float from an Australian company on US markets—was also heavily oversubscribed, further demonstrating that Australian technology was an attractive investment class.

5. Since 2016

On the back of these deals and incentive schemes, there was a groundswell of interest in innovation and entrepreneurship, and the mood of the Australian economy shifted positively. Entrepreneurship became fashionable, and some superannuation funds have returned to support venture capital.

The Federal Government established a \$500m Biomedical Translation Fund (BTF), with \$250m of Commonwealth funding that has been matched by private sector investors. Three funds were set up, managed by Brandon Capital, OneVentures, and Bioscience Managers.

All major research organisations now have programs in place to support innovation, including incubators and accelerators.

More venture firms and angel investors became focused on research-based start-ups. On the back of the Fibrotech, Spinifex, and Hatchtech exits over 2014 and 2015, international investors also showed an interest—an example being the IP Group Australian Go8 fund established in 2017.

Looking at past lessons, the innovation sector has been an easy target to achieve the desired fiscal result. In 2004, the START grant scheme morphed into the CommReady Scheme after a change in Federal Government, whereby the START and BIF schemes were absorbed into the new scheme. This started an alarming trend over subsequent years where each new Government (with each change in a political party) would throw out the old scheme and introduce a new, slightly less friendly, and less generous grant scheme. In each case, the changeover was tedious and provided uncertainty to start-ups and investors.

6. 2020 – COVID-19 and coping post the pandemic

In early 2020, the innovation sector has sustained a second major setback with COVID-19, and this will arguably be of even greater impact than the 2008 GFC. With an unforeseeable end to the COVID-19 crisis, this pandemic is going to be with us for a long time, and we have to prepare for an unknown future. Generally, sectors on the decline will continue to be so, differentiation will become minimal, and pressure on budgets will get tighter. The demand for evidence will be greater, and the quality of the evidence will need to be higher.

Just as occurred after the GFC, new funds will not be formed as frequently, and existing funds will focus investment on supporting their existing portfolio at the expense of new investments.

All universities have received a significant negative impact on their budgets due to the loss of international student revenue, which will last for some time. In some cases, budget holes as large as \$600m have been reported. Furthermore, students may not return immediately when travel restrictions are finally lifted, so this problem may last for several years.

Start-up companies have also been impacted to varying degrees by COVID-19, with only a minority benefiting from the current situation. As an example, there is increased customer interest in Cardihab's remote cardiac rehabilitation program due to reimbursement codes for telehealth being opened by Federal Government and clinicians now unable to perform cardiac rehab face to face as the patient group is very vulnerable to COVID-19. Examples of some of the negative impacts of COVID-19 on start-up companies are:

- Clinical trials postponed or put on hold;
- International sales impacted;
- Some research programs at university laboratories delayed or on hold;
- Delays in the supply of components for products; and
- Delays in the progress of commercial discussions.

The amount of money invested in some sectors, especially healthcare, either through VC funds or PE will increase, but finding a good "home" for that cash will become increasingly difficult.

7. Increased national protection

At the moment, nations are redefining their relationships with the rest of the world. The sale and transfer of tech on a cross-border basis will be limited, with increasing levels of regulatory supervision. There will be a rush toward protectionism and increased regulatory scrutiny—an example being the recent changes to FIRB exemptions on foreign investment and ownership. It is expected that a cultural significance, fuelled by the effect of COVID-19 on employment, will ensure that "locally manufactured and sourced" will command value. This will have a significant effect on companies looking to internationalise their business, but also provide local market flexibility and agility.

8. Flexibility in relation to supply chains

There are massive implications for the supply chain moving forward, the level of stock being held, with a significant impact on companies developing products with a specific shelf-life. With a culture of protectionism arising, the need for onshoring and flexibility in the supply chain will increase.

A changing mindset for both companies and purchasers can have a long-term market effect:

The global response and need for ventilators have identified a significant opportunity and potential threat to the health tech industry. There are examples of companies that have written 12 months' worth of software code or R&D in two months to get a product on the market, and others that have re-tooled and started making ventilators from a new. Burberry (a high-end UK fashion chain) switched from clothes to protective gowns, and Rolls Royce now makes ventilators as examples. The mind shifts from both the companies and the purchaser's perspective have been significant.

9. Strive to achieve agility

Historically, most M&A transactions were based around either a cost reduction or revenue generation strategy. There seems to be a shift toward capability acquisition as companies try to re-align for the future and the increased acceptance of data monetization. This will accelerate as companies begin to look to develop strategies to increase agility. The search for capability and new business models will be one of the primary drivers for acquisitions moving forward.

10. Restricted access—break in traditional selling mode, and need for digital engagement

A change in the traditional selling model will take place. While little change has happened to the “sales representatives” culture, this situation will accelerate the pressing need for companies to engage in more digital marketing. As engagement in new digital ways ensues, the significant reduction in SG&A expenses will become the new normal as companies manage their cash flow more closely and examine the return on expenditure.

Peter Devine is CEO of Uniseed and has extensive experience at board and executive management levels in the commercialisation of early-stage technologies, having held senior R&D, business development and commercialisation positions in several Australian companies and Australian universities. Has served on the Board of numerous start-ups which have collectively raised over AU\$300m, with a number of these being successfully sold to large multi-nationals in deals collectively worth over AU\$1.75b.



Peter holds a PhD from the University of Queensland and received the Dean's Prize for his MBA studies at the Australian Graduate School of Management. He is a Graduate and Fellow of the Australian Institute of Company Directors and holds a Diploma of Financial Services (Financial Markets) and a Graduate Diploma in Applied Finance from Kaplan Professional. Peter was previously VP of Business Development at ASX-listed Progen Industries Ltd. He was Research, Development and Commercialisation Manager at Brisbane-based PanBio Pty Ltd from 1996 to 2000, which ultimately was sold to Inverness Medical. He received a Federal Government Centenary Medal in 2003 for outstanding contribution to the business of biotechnology.

Recent Uniseed successes include Fibrotech Therapeutics' sale to Shire in 2014; the Spinifex Pharmaceuticals sale to Novartis in 2015; the Hatchtech sale to Dr Reddy's in 2015 and FDA approval in 2020; the Smart Sparrow sale to Pearson on 2020 and Exonate's collaborative agreement with Janssen in 2020.

Rabab Nasrallah is an investment analyst with Earlybird Venture Capital based in Germany, with a major focus on investments in the health care space. Prior to this role, Rabab was the program manager for the INCUBATE accelerator based at the University of Sydney, Australia. With an extensive research background, Rabab has held roles in leading global research organisations in Australia and the UK, including The George Institute for global health, Lowy Cancer Research Centre, Cancer Research UK, and Cambridge University.



Rabab has a PhD in regenerative medicine from UNSW, Australia. Following her postdoctoral fellowship at the Babraham Institute, Cambridge, she published a first author Nature paper in 2020.

John Kurek is the Biotechnology Investment Manager at Uniseed, Australia's longest-running venture fund, operating at the Universities of Melbourne, Queensland, Sydney & New South Wales, and the CSIRO, with investment capital provided by these research organisations. At Uniseed, John is responsible for identifying new investment opportunities from the five research partners, and also covers



Uniseed's overall biotechnology and life sciences portfolio. Uniseed has returned significant capital to its investors, including Novartis acquisition of Spinifex for US\$700m; Shire plc acquisition of Fibrotech Therapeutics for US\$557m; and Hatchtech sale to Dr Reddy's Laboratories for ~US\$200m.

John brings 20 years of industry experience as a Biotechnology Manager with a focus on the strategic design and implementation of drug development programs. John's previous roles have been with ASX listed biotech companies BioDiem Ltd and Amrad Corporation Ltd., where he was responsible for the management of preclinical and early clinical stage drug development projects. His experience extends from late drug discovery to the phase I-II clinical phases of drug development. John's experience covers a range of areas, including 1) Acting as Director on investee company boards, 2) Biotechnology project management, 3) Investment analysis and due diligence, 4) Financial modelling, 5) Intellectual property management, 6) Business development, 7) Risk management, and 8) Relationship management.

John has a PhD in Neuroscience and a Post Graduate Diploma in Drug Evaluation & Pharmaceutical Science, both from the University of Melbourne, and is a graduate of the Australian Institute of Company Directors.

Case Studies



Additive Assurance

Fiona Lewis

Abstract: Additive Assurance, a Monash University spin-out, is the first company in Australia to commercialise a 3D printing quality assurance technology. The company has developed an in-situ monitoring tool to provide real-time defect alerts, and has secured investment from the UK's IP group to commercialise its 3D printing quality assurance technology.

Keywords: Additive assurance, 3D printing, quality assurance

1. The success story—Additive Assurance

With the potential to disrupt existing commercial manufacturing techniques, 3D printing, otherwise known as additive manufacturing, has the potential to revolutionise industries such as aerospace and defence, which are reliant on conventional manufacturing techniques. However, the need to ensure each and every part is defective-free and printed without issue is paramount in ensuring 3D printing moves from a great prototyping tool to commercial manufacturing. Additive Assurance is a research-based spin-out at Monash University that commercialises a metal 3D printing quality assurance technology. Although quality control for 3D printing may not be the sexiest start-up idea, the founders of Additive Assurance are well on their way to changing this concept with investment from the UK's IP group.

2. Where did it start and the motivation?

The co-founders of Additive Assurance, PhD candidate Marten Jurg and his supervisor Dr Andrey Molotnikov, are researchers in the additive manufacturing space. Throughout their own research and collaborating with industrial partners, they encountered the quality assurance issue in 3D printing first-hand. Using 3D printing on a daily basis, they spent wasted time reprinting defective prints. The standard process only allows users to determine if a product was faulty or not at the final stage of production. Traditional methods for identifying defects exist. These are costly methods, relying mostly on using CT imaging, with exorbitant annual running costs and setups requiring more than a million dollars. To make additive manufacturing viable in the commercial world, both time and cost reductions must be introduced into the current workflow.

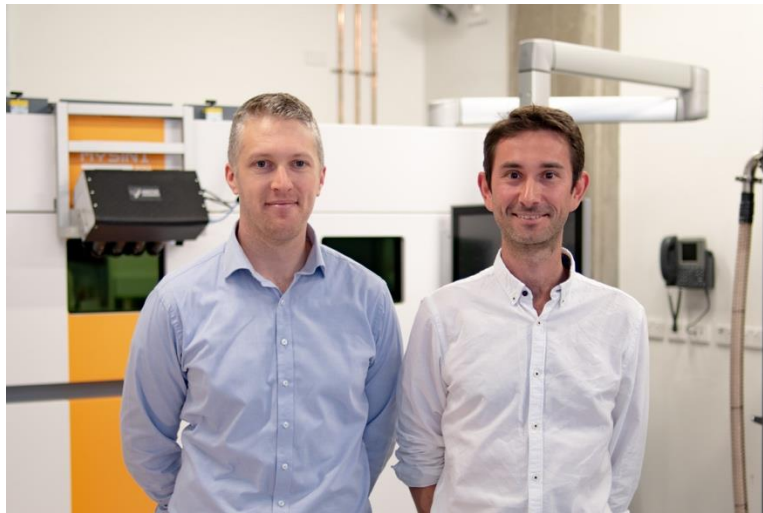


Figure 1. From left to right: Dr Andrey Molotnikov and Marten Jurg from the Department of Materials Science and Engineering (MSE) at Monash.

Additive Assurance has developed an in-situ monitoring tool that can provide real-time defect alerts. This process eliminates waste, as defects can be identified and rectified during the printing process. The technology also allows for full process traceability, i.e., the quality of the 3D-printed metal parts is guaranteed, and printing is adapted across several industries, including aerospace, energy, defence, and medical devices.

3. The journey so far

Whilst the technology was solid, Marten and Andrey were still trying to find their start-up feet and make the transition from scientists to CEO's. They joined the 2018 Accelerator Program, run by the Generator out of Monash University. Over three months, the pair grew as founders, most notably refining their communication around Additive Assurance, adopting a language that not only allowed the research community to understand their project but to a broader audience, including investors. In September 2019, the IP group funded their innovative idea and got a foothold in the market.

Monash University has strongly supported them from the very beginning where they received support throughout the whole process from Monash's tech transfer team, Monash Innovation, to protect their IP and develop a commercial strategy. They secured some initial seed funding from the Monash Research Impact Fund, a dedicated fund created by the University designed to support inventions and new concepts for which commercial potential has been identified to develop proof-of-concept. Their entrepreneurial skills were honed during their time at Monash, using existing expertise and skills developed as scientists to become formidable founders.

4. Look into the future

With plans to expand their team in the coming year and continue their rapid growth and disruption, this is only the beginning of Additive Assurance and their path to revolutionising additive manufacturing across the globe.

The company



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Fiona Lewis is the Program Coordinator of the Monash Generator Program, the entrepreneurial hub of Monash University. She has been involved in start-up support programs since 2014, running the very first accelerator program at Monash University. She has supported hundreds of early-stage start-ups through the Generator's programs during this time.

Fiona holds a Bachelor of Biomedical Science (Honours) and a Masters of Business (Science & Technology), both from Monash University. Prior to working in start-up support programs, she worked in the Office of the Vice-Provost (Research and Research Infrastructure) at Monash University, supporting the Monash Technology Research Platforms and research infrastructure activities across the University.



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URL: <http://iai.digital/2020/detected-x>

DetectED-X Marks the Spot...

Zoë Callister-Hakewill

Abstract: DetectED-X, a Sydney-based medical imaging start-up, has developed an online learning platform to improve the clinical diagnosis and treatment of breast cancer. The company today is an international leader in medical imaging education, training, and assessment.

Keywords: DetectED-X, 3D printing, quality assurance

1. The success story—DetectED-X

Breast cancer is one of the leading causes of death in females worldwide. Early diagnosis and treatment are primarily associated with good prognosis and improved long-term remissions. Some of the key challenges in breast cancer screening are not rooted in the lack of technological advancement for detecting breast cancers but in the healthcare system's operational overload. The online learning platform engineered by DetectED-X, *Rivelato*, has been developed to provide uniformity in radiological training and optimised to facilitate clinical decision making. In the last year, DetectED-X has been embraced by the international community (validated in Australia, New Zealand, Asia, Middle East, US, and Europe) for its evidence-based approach for improving the clinical diagnosis of breast cancer.

2. Where did it start and the motivation?

Collaborating on DetectED-X, Dr Suleiman, Professor Brennan, and Professor Rickard combined their specialist skills to develop a novel educational approach after identifying two key challenges in breast cancer screening. First, it was observed that radiologists reading for breast cancer screening encounter a relatively low number of cancer cases. This was attributed to the low prevalence of breast cancer. Second, radiologists have varying clinical experience, which means that they tend to approach breast cancer detection differently and often do not receive timely feedback.

Zoë Callister-Hakewill: INCUBATE, University of Sydney Union, Sydney, NSW, Australia

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License





Figure 1. Photograph of Professor Patrick Brennan (CEO, Co-Founder) and Dr Moe Suleiman (CTO, Co-Founder) at RSNA 2019, USA launch.

3. The journey so far

The initial research platform relied on grant funding and was limited to Australian radiologists. In 2019, the platform was widely adopted in Australia, giving the team enough support to commercialise its product and aim for international expansion. DetectED-X ultimately aims to create a paradigm shift in cancer detection globally, especially in developing countries, where this type of education is lacking.

DetectED-X joined the INCUBATE program in 2019, transforming its platform into a legitimate business venture. *“[INCUBATE] guided us through the process step by step, everything we needed to know was answered by experts and entrepreneurs who have gone through the process and were very successful,”* says Dr Suleiman, *“I think that the support that INCUBATE provides to start-ups is essential and life-changing”*.

Since mid-2019, DetectED-X has seen widespread international adoption. Highlights include CPD point accreditation in both Australia and New Zealand, in addition to CME point accreditation within the US. DetectED-X has also secured contracts with the Department of Health in New Zealand and Slovenia. The company is currently in advanced discussions with multiple hospitals and imaging clinics throughout the US. In addition, the team is also in the process of finalising a distribution agreement with an international vendor for imaging software.

When the World Health Organisation called for solidarity in the global response to the COVID-19 pandemic, the DetectED-x team quickly adapted their platform to help educate clinicians to identify the appearances of COVID-19 on CT scans, *“we made it available free of charge to all clinicians around the world, CovED was truly a multi-national multi-disciplinary consortium of collaboration in the face of a global pandemic.”*



Figure 2. Photograph of CovED software platform - CovED is a browser-based application, allowing clinicians to improve detection performance remotely from a Mac or PC. Clinicians have access to a database of lung CT scans which may be used as a training tool to accurately diagnose cases faster COVID-19 cases more rapidly.

4. Look into the future

Despite much success, Dr Suleiman laments on the challenges of balancing family life and getting a small start-up off the ground *“it was time-consuming learning and trying to work out the ins and outs of the business. Some days I worked around the clock with little sleep”*. Hurdles faced along the way, including *“navigating IP issues took some time, trying to convert interest into paying customers as well as securing customers instead of research collaborations,”* became pivotal points for re-engagement with the company’s purpose of improving patient outcomes. With many accomplishments to date, the future looks bright for DetectED-X; the company is rapidly becoming recognised as an innovative international leader in medical imaging education, training, assessment, and research. Dr Suleiman remains humble but optimistic about the future, *“I think success is an elusive term we always aim for more”*.

The Company



DetectED-x Pty Ltd

Sydney

NSW 2008

Australia

<https://detectedx.com>

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In 2015, **Zoë Callister-Hakewill** joined Dr's On Call, a mobile medical outreach service which has been operating in greater Sydney for the past 20 years. As Chief Health Officer, Zoë oversees the implementation of legal and ethical telehealth policies to ensure the successful delivery of quality clinical care in a new, COVID-19 friendly, digital format. Her responsibilities include guiding clinical team decision-making that aligns with best practice in the digital health space, business development with various stakeholders to address the primary health care and palliative needs of the disabled and elderly, raising awareness, and reducing stigmatisation for the mentally ill, providing auxiliary services to the homeless and mobilising support for victims of abuse.



Zoë has cultivated a wide base of skills through her extensive tertiary studies, in the fields of public health, health law and ethics, allowing her to facilitate the transformation of a paper-based medical practice, into a leading digital healthcare platform and under her guidance, Dr's On Call has seen a considerable uptake in its services amongst its clients, particularly in residential aged-care facilities whom otherwise may not have access to quality healthcare in a COVID-19 safe manner.

Zoë is a graduate of the University of Sydney where she holds a Bachelor of Medical Science, a Masters of International Public Health, and a Masters of Health Law. She is currently finishing a Bachelor of Psychology (Honours) at Macquarie University. She is employed as a Research Officer in the Department of Cognitive Science, where she is part of a research group, which employs the use of commercial mobile EEG technology to investigate brain health.

Zoë is passionate about remaining committed to community outreach and continuing to employ biotechnology to improve future health outcomes for all.

Cite as: Olivana Smith-Lathouris, Displaying Impact on a World Stage, Innovation & Impact 2020

URL: <http://iai.digital/2020/espresso-displays>

Displaying Impact on a World Stage

Olivana Smith-Lathouris

Abstract: Espresso displays is a tech hardware company that has developed an ultra-thin USB-powered portable LED monitor that is easy to transport and use on-the-go. The company is now launching its product worldwide.

Keywords: Espresso displays, ultra-thin LED, UTS

1. The success story—Espresso Displays

We all experience daily frustrations with our technology and their bulky parts. Display technologies are changing quickly, with higher resolutions, new applications like flexible displays, and AR/VR headsets. There are many opportunities to innovate in this space to create the workplace of the future. We are becoming increasingly excited about what we can do. Espresso Displays is a tech hardware company that develops thin USB-powered portable monitors to address this exact problem. The company is developing a super-thin LED monitor that can reach out to diverging markets by capitalising on its simplicity. The concept is very simple; it's your office in a bag, a workspace you can take anywhere and plugin when you need it. The device can work with anything that is USB-C enabled—a phone, a laptop, or a tablet.

2. Where did it start and the motivation?

The idea started when UTS start-up co-founders, Scott Mckeen and Will Scuderi, were trying to finalise a university assignment one night and were in need of an extra display screen. Upon further research, the team could not find any product that ticked all the boxes.

That night Will 3D-printed the first product iteration of Espresso Displays. "From then on, it was all they could talk about", says Scott, and the idea was for them to develop the product themselves. Less than a year later, their one-off solution to a small problem became the foundation of their full-time business, Espresso Displays.

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Figure 1. The world's thinnest usb-powered displays—Espresso displays.

The Espresso Display technology is an ultra-thin USB-powered portable LED monitor that is easy to transport and use on-the-go. The minimal design could easily be integrated into office setups and promote the configuration of the user's workspace to their personal preferences.



Figure 2. From left to right: Espresso displays co-founders, Mathew Childs, Scott Mckeen, and Will Scuderi.

3. The journey so far

For Scott and Will, the UTS Start-ups community was the turning point for their business, providing support, guidance, and mentorship throughout the setup of their company. To date, the company boasts over 1500 users worldwide, including organisations such as Atlassian.

Scott reflects on how far Espresso Displays has come since first starting out, “It wasn’t long ago that we were googling how to buy a domain name and how to make a website. We really were just getting started”, he said.

4. Look into the future

For now, the Espresso Displays team is thrilled to be riding a wave of innovation and what the future holds for more tech-guided innovative products, i.e., flexible displays, transparent smart glasses, rollable screens, etc., and our interaction with screens will be different in the future to come. Driven by their entrepreneurial spirit, Espresso Displays are determined to be at the forefront of that change.

Throughout the team's work over the last year, the co-founders have realised it's not about getting the right job or the right title and moving up the chain, it's about developing the learning, being able to do more, and seeing how things work more clearly. Scott is now encouraging other students to get involved in entrepreneurship and to pursue their curiosities.

Following our pre-sale campaign, Espresso plans to hard launch into key geographies, including the USA, UK, EU, SGP, and Australia. The goal is to scale our hardware sales, learn more from our existing customer base, and launch new products in our roadmap.

The company



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Olivana Smith-Lathouris is a fourth-year journalism and law student at the University of Technology Sydney (UTS). She has worked in communications for the UTS Innovation and Entrepreneurship unit for a year and now works full time as an Associate Producer for Nine News while interning with a Sydney law firm. In her first few months as a journalist, she was part of the digital news team that has recently been selected as a finalist for the Kennedy Awards for their coverage of the 2019/2020 bushfire crisis. She was also the recipient of the Legal Entrepreneurship Scholarship for 2019/2020 after being selected as a finalist in the UTS Start-ups Sustainability weekend for her start-up Foodwise—a digital platform that helps consumers make more sustainable choices when choosing a place to eat.'



Cite as: John Kurek, Peter Devine, Exonate—Global R&D Effort in Drug Discovery Leads to Collaboration With Big Pharma, Innovation & Impact, 2020
URL: <http://iai.digital/2020/exonate>

Exonate—Global R&D Effort in Drug Discovery Leads to Collaboration With Big Pharma

John Kurek, Peter Devine

Abstract: Exonate, a Sydney-based ophthalmology start-up biotech company, has developed an eye-drop treatment for Diabetic Macular Oedema and wet Age-Related Macular Degeneration in a strategic collaboration agreement with Janssen Pharmaceuticals, Inc.

Keywords: Exonate, diabetic macular oedema, macular degeneration, retinal disease.

1. The success story—Exonate

Diabetic Macular Edema (DME) and wet Age-Related Macular Degeneration (wAMD) are some of the leading causes of vision loss in people aged 60 and older. VEGF signalling has been identified as an underlying molecular mechanistic driver of these ophthalmic diseases. Drugs that inhibit VEGF and its receptors are already the standard of care for several diseases, including wAMD and DME. These drugs are administered by an injection into the eye and are also a mainstay of cancer therapy. Exonate—an early-stage biotech company built on an IP from the University of New South Wales, the University of Nottingham, and the University of Bristol—is focused on alternative splicing of Vascular Endothelial Growth Factor (VEGF) in ophthalmology. Exonate has developed small molecules that inhibit the production of pro-angiogenic VEGF through selective inhibition of serine/threonine-protein kinase 1 (SRPK1)-mediated VEGF splicing. These inhibitors have demonstrated superior efficacy as topical agents in preclinical models of wet AMD.

2. Where did it start and the motivation?

Exonate was established in 2013, from early collaborative work between the Universities of NSW, Bristol, and Nottingham, with a mutually owned IP. Professor Jonathan Morris at UNSW, Sydney pioneered the small molecule SRPK1 inhibitors' work, and Professor David Bates at the University of Nottingham specialised in the biology and biochemical pathways of VEGF splice variants. The collaboration allowed Exonate to develop small molecules that inhibit the production of pro-angiogenic VEGF through the selective inhibition of

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serine/threonine-protein kinase (SRPK1)-mediated VEGF splicing. VEGF is alternatively spliced into two classes of proteins—pro-angiogenic VEGF-Axxx_a isoforms, which are responsible for disease progression, and anti-angiogenic VEGF-Axxx_b isoforms, which mitigate these effects through competitive binding [1]. By exploiting the alternative splicing of VEGF, Exonate is developing an eye drop that can penetrate the back of the eye, reach the retina, and stop blood vessel growth to treat wet AMD and DME. With many patients not responding to existing treatments, Exonate's lead program has the potential to become the patient's treatment of choice in these retinal eye diseases, which remain an area of high unmet medical need.



Figure 1. Exonate team: Professor Steven Harper (Medical Director), Sunil Shah (Chairman), John Kurek (Biotechnology investment manager, Uniseed), Dr. Catherine Beech OBE (Chief executive officer), Professor David Bates (Chief Scientific Officer), Dr. Andrew Naylor (CEO, Nottingham Technology Ventures Ltd), Dr. Chris Torrance (Chief Executive Officer, PhoreMost Ltd).

3. The journey so far

Uniseed first invested in Exonate in November 2016—one of the first investments from its most recent commercialisation fund (Fund-3). Uniseed is a partnership between The University of Queensland, The University of Sydney, The University of New South Wales (UNSW Sydney), The University of Melbourne, and the CSIRO. In 2018, Uniseed participated in a follow-on investment round, with just over \$836,000 invested by Uniseed over both rounds. Exonate is domiciled in Cambridge UK, though with the investment rounds supported by Uniseed, Exonate has funded a significant amount of contract R&D in the laboratory of Professor Morris at Uniseed's partner research organisation, UNSW. In 2017, Exonate also received a £4.9m Wellcome Trust Seeding Drug Discovery Award (one of the largest awarded). The funding allowed Exonate to complete a lead optimisation programme, nominate a preclinical candidate drug with optimal characteristics, and complete regulatory toxicology and safety pharmacology studies that would support an application to the

regulatory authorities for clinical evaluation. Exonate expects to reach this milestone and enter the clinic in 2020.

4. Look into the future

In January 2020, Exonate announced that it had entered into a strategic collaboration agreement with Janssen Pharmaceuticals, Inc. The collaboration facilitated by Johnson & Johnson (J&J) Innovation, allows Exonate to work with Janssen R&D scientists to develop an eye drop treatment for retinal vascular diseases, such as wet AMD and DME based on Exonate's small molecules. These collaborations are of mutual benefit for both parties. While it can be tempting for VC's such as Uniseed to continue funding the development program and complete clinical trials before entering into a deal, small biotech companies also need to be nimble and continually review their strategy. In this case, the partnership with J&J was the best strategic decision for Exonate. Janssen Pharmaceuticals is one of the largest pharmaceutical companies in the world and tapping into their expertise, and global resources are invaluable at the preclinical and clinical stages of development. For a start-up company, the risk-reward analysis and probability of success (or failure) are never static, it is on a continuum, and you need to continually look at commercial opportunities as they arise because in some cases, it may make more financial sense to do a deal early.

The Company

The logo for Exonate, featuring the word "Exonate" in a bold, sans-serif font. The "Ex" is in blue, and the "onate" is in a dark blue or black color.

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John Kurek is the Biotechnology Investment Manager at Uniseed, Australia's longest-running venture fund, operating at the Universities of Melbourne, Queensland, Sydney & New South Wales, and the CSIRO, with investment capital provided by these research organisations. At Uniseed, John is responsible for identifying new investment opportunities from the five research partners, and also covers



Uniseed's overall biotechnology and life sciences portfolio. Uniseed has returned significant capital to its investors, including Novartis acquisition of Spinifex for US\$700m; Shire plc acquisition of Fibrotech Therapeutics for US\$557m; and Hatchtech sale to Dr Reddy's Laboratories for ~US\$200m.

John brings 20 years of industry experience as a Biotechnology Manager with a focus on the strategic design and implementation of drug development programs. John's previous roles have been with ASX listed biotech companies BioDiem Ltd and Amrad Corporation Ltd., where he was responsible for the management of preclinical and early clinical stage drug development projects. His experience extends from late drug discovery to the phase I-II clinical phases of drug development. John's experience covers a range of areas, including 1) Acting as Director on investee company boards, 2) Biotechnology project management, 3) Investment analysis and due diligence, 4) Financial modelling, 5) Intellectual property management, 6) Business development, 7) Risk management, and 8) Relationship management.

John has a PhD in Neuroscience and a Post Graduate Diploma in Drug Evaluation & Pharmaceutical Science, both from the University of Melbourne, and is a graduate of the Australian Institute of Company Directors.

Peter Devine is CEO of Uniseed and has extensive experience at board and executive management levels in the commercialisation of early-stage technologies, having held senior R&D, business development and commercialisation positions in several Australian companies and Australian universities. Has served on the Board of numerous start-ups which have collectively raised over AU\$300m, with a number of these being successfully sold to large multi-nationals in deals collectively worth over AU\$1.75b.



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Cite as: Peter Devine, The Fibrosis Start-Up That Helped Put the Australian Biotech Scene on the Map, Innovation & Impact, 2020
URL: <http://iai.digital/2020/fibrotech>

The Fibrosis Start-Up That Helped Put the Australian Biotech Scene on the Map

Peter Devine

Abstract: Fibrotech, a Melbourne-based biotech start-up, that was formed in 2006 to develop novel drug candidates for the treatment of fibrosis, prevalent in chronic kidney disease. In 2018, Fibrotech was re-established as Certa Therapeutics to support Phase II clinical trials for the lead candidate, FT011.

Keywords: Fibrotech, fibrosis, kidney disease.

1. The success story—Fibrotech

Prevalence of kidney disease, and thereby fibrosis, continues to increase as the population ages, with treatment costing approximately US\$1b of annual healthcare expenditure in Australia alone. Fibrotech developed a chemical compound that could effectively reduce scar tissue as a potential treatment for fibrosis. At these early days of biotech growth within Australia, support for Fibrotech was sparse despite there being clinical demand in the space where the global estimate value was \$5b.

2. Where did it start and the motivation?

In a University of Melbourne lab, an idea to treat kidney disease sufferers and potentially prevent fibrosis or scar-tissue was born. Prof. Darren Kelly and his team at the university were working on a compound which was shown to have anti-scarring and fibrotic effects in the kidneys and heart. In collaborating with chemist Spencer Williams, Kelly was able to develop the medical chemical programme enhancing the efficacy of the compound, effectively reducing scar tissue as a potential fibrosis treatment. However, due to patenting issues, the compound could not be progressed.

Kelly spent 18 months raising money for the fibrosis treatment he knew had huge potential. After rounds of disappointing meetings, UniSeed made an initial commitment to Fibrotech, and the MRCF joined in the first round of funding. Dr Chris Nave of the MRCF and Dr John Kurek from Uniseed joined the Fibrotech board. "We were impressed with Darren and his understanding of the market and the disease. He was a rare individual—both a great academic researcher, but also capable of leading the company as CEO".

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3. The journey so far

In 2007, support mechanisms were thin. Ann Hamer, COO, and Kelly relied on the networks of UniSeed and the MRCF to progress the drug, and the sole founder was responsible for fund-raising. In 2009, in an Australian first, Fibrotech was awarded a Type 1 Diabetes RAID Grant from the US National Institute of Health. This in-kind grant from the US was a milestone for the Australian biotech landscape. This opportunity awarded Fibrotech much leverage. Despite pressure from US VC firms to bring the company stateside, Kelly was adamant the company would remain in Australia. Companies now have resources available in Australia, such as R&D tax concessions, allowing them to complete later stage clinical trials in Australia without the need to move to the US. Fibrotech helped shape the biotech industry in Australia as we know it today.

With no real team and a small budget, Hamer and Kelly worked with a revolving door of consultants to advance the lead drug to clinical trials. Fibrotech Therapeutics' 2014 deal with UK pharmaceutical company, Shire, was revolutionary, leading to a positive shift in the investment sector. This deal, valued at over US \$500m, showcased the huge returns that university-generated start-ups could deliver and validated Australian biotech research. The deal was named "Best Early Stage Deal of the Year" by AVCAL in 2014, and the exit was recognised as a game-changer by the prestigious journal *Nature*.



Figure 1. Certa Therapeutics chief executive and founder Darren Kelly, front, with (left to right) Emile Brys, chief commercial officer; Ann Hamer, chief operating officer; Dr Chris Nave, Medical Research Commercialisation Fund chief executive; John Kurek, Uniseed investment manager; Michelle Papadimitriou, research and development manager.

UniSeed's first blockbuster exit, Fibrotech was a significant deal to the fund—returning US\$75m to shareholders the MRCF and Uniseed. Shire then committed to completing a Phase 2 program with Fibrotech's lead drug FT-011. However, in 2016, Shire acquired Baxalta and subsequently advised that they were discontinuing the Fibrotech program. Shire terminated

over 100 early-stage programs, of which Fibrotech was a casualty. Fortunately, Shire returned the new drugs and data they had developed to former Fibrotech shareholders. This enabled the development program to continue in a new company supported by Fibrotech investors Uniseed and MRCF, with Kelly returning as CEO. Fibrotech was re-established as Certa Therapeutics in 2018, with \$25m raised to support Phase-2 studies.

4. Look into the future

Fibrotech generated a groundswell of interest in the potential of university research, while the Australian economy improved following the Shire deal. University entrepreneurship has now become fashionable, and superannuation funds have returned to support venture capital. The Government has also become more supportive, with schemes such as the Biomedical Translation Funds introduced in December 2016 on the back of Fibrotech's success.

Certa now has a fantastic team of over ten experts, and the landscape has drastically changed. The larger team enables better long-term collaboration, and Kelly learned through his networks the importance of having robust technology management, when to hire or to outsource, and when to engage with clinical research organisations. The collaborative benefit of having a team versus consultants allowed the promising Australian biotech start-up to remain in Australia, conduct its research and development here, benefitting the Australian economy, and ultimately creating jobs.

Now Certa is about to go into Phase II clinical trials for two indications, including lead candidate FT011 with hopes to have this oral therapy for the treatment of fibrosis on the market within five years.

The company



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From Drug Discovery to FDA Approval, Innovation & Impact, 2020
URL: <http://iai.digital/2020/hatchtech>

Hatchtech—the Long Road From Drug Discovery to FDA Approval

John Kurek, Peter Devine

Abstract: Hatchtech, an Australian pharmaceutical company, has become the first Australian company to have a drug approved by the US Food and Drug Administration (FDA) for the treatment of head lice.

Keywords: Hatchtech, head lice, Xeglyze.

1. The success story—Hatchtech

Hatchtech was borne out of the need to develop new control strategies for parasites of an importance to humans and livestock. The focus on head lice was based on the need for improved products that were effective against the lice and, more importantly, their eggs, since available products, in general, are not highly effective at killing lice eggs, although they are promoted as such.

The company's lead product is Xeglyze®, a single application head lice control agent safe for use in children. In 2015, Hatchtech signed an agreement with the integrated pharmaceutical company Dr 'Reddy's Laboratories for up to \$279m to commercialise this product.

2. Where did it start and the motivation?

Hatchtech was founded in 2001 by Dr Vern Bowles from the University of Melbourne. Hatchtech is an Australian venture-backed speciality pharmaceutical product company that is developing technologies for the control of invertebrate pests. The product is presently awaiting regulatory approval from the FDA in the United States, where it will be sold as a prescription head lice product.

3. The journey so far

Initial seed funding for developing the lead program was obtained from Uniseed, which was later matched with Government funding through the Biotechnology Innovation Fund in 2002. From 2005 to 2009, Uniseed assisted Hatchtech in securing additional investment from other venture capital firms, including GBS Ventures, QIC Bioventures, and Biocomm, with the

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University Melbourne also investing from their endowment fund. Subsequent investors in Hatchtech's development included OneVentures in 2010 and Blue-Sky Venture Capital in 2013. The company was a recipient of further non-dilutive funding from the Australian Government's Commercial Ready scheme, Export Market Development Grant, as well as the R&D tax incentive scheme. The company ran almost like a virtual company with a COO and CSO in the first 4–5 years and subsequently engaged a CEO, with the current CEO Hugh Alsop joining Hatchtech in 2013.



Figure 1. R Hatchtech CEO Hugh Alsop, Associate Professor Vern Bowles and Hatchtech Chairman Paul Kelly.

Hugh further expanded the team to include members with enhanced regulatory and clinical expertise, who oversaw the development and regulatory strategy of the company. A significant amount of Hatchtech's development was outsourced as needed. The focus was always on identifying excellent contractors to undertake the required work which would meet FDA requirements. In 2014, the company achieved a key milestone by successfully completing two phase 3 studies in the US. The studies conclusively demonstrated that Hatchtech's head lice product was highly effective in killing both the lice and their eggs with a single 10-minute treatment, without the need for combing. On the back of these results, Hatchtech was able to attract commercial interest leading to the deal with Dr Reddy's to take the product through the regulatory approval process and onto the market when the New Drug Application was filed with the FDA (headline deal value US\$200m).

After submitting the NDA to the US FDA in 2015, Hatchtech finally received regulatory approval of its head lice product Xeglyze® in July 2020. FDA approval had been delayed due to deficient quality practices cited by the FDA during audits at Dr Reddy's manufacturing plants in India. Whilst none of the quality issues involved Hatchtech's product, the agency would not approve any new products from the facilities in question until the remediation was complete. This delay, which was outside Hatchtech's control, highlights the risk that exists right through the drug development process.

4. Look into the future

To give context to the significance of this achievement—the number of drugs approved by the FDA that have been developed, or substantially developed, by Australian companies is 12, and of these, there are only five new molecular entities such as Hatchtech's.

With FDA approval secured, it will be of interest to see how the Hatchtech drug penetrates to the US\$200+ million prescription headlice market in the USA.

Key insights from this journey are that successful deals do not just happen. Drug development is always about managing risks and adopting a disciplined approach and strategically thinking about all that could go wrong, and mitigating risk by implementing plans where possible to reduce that probability and reduce the potential impact. It would help if you also were prepared for the curveballs... they are on their way, and you will need to meet them head-on! Adopting the excellence mindset is also essential: to the team, in planning, in execution, in advisers, and providers.

The company



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A Grain of an Idea Grows Into a Successful Product

Siobhan Curran

Abstract: A Newcastle-based start-up that has developed a platform technology to help Australian winemakers and scientists improve the quality of their grapes by providing real-time analysis of their samples. The software is today a standalone product and used across Australia.

Keywords: Hone, wine, real-time decision making, farmers

1. The success story—Hone

Hone has developed a platform technology that gives farmers the ability to make informed decisions in real-time with no disruptions. The Hone device is a complete platform that attaches to the back of a smartphone and uses spectroscopy techniques¹ to assess the chemical traits of any solid or liquid. The data captured by the device is transferred to an artificial intelligence (AI) cloud via Hone's smartphone app and decoded for the quantitative or qualitative variables of interest the user has specified for that sample.

Using winemaking as an example, Hone's platform can be utilised throughout the entire winemaking cycle, from the analysis of soil nutrients to the uptake of nutrients by a vine, through to the sugar, tannin, and acid levels of the fruit itself. The same analysis can be applied from crush to bottling, allowing the winemaker to monitor for the desired chemical balance or to provide early detection of unwanted chemical traits. Hone's technology allows a winemaker to make key decisions about each and every vintage within seconds.

2. Where did it start and the motivation?

In 2014, then PhD students Antony, William, and Jamie participated in a project attempting to breed the best version of cereal grain for a biofuels project. A significant hurdle in this area is that analysing samples was time-consuming and expensive. With early backing from the University of Newcastle, angel investors, and the Australian government, Hone's co-founders have successfully revolutionised what has been a traditionally very slow, arduous, and expensive process for farmers.

The early work was supported by a grant from HMRI in a medical imaging lab, providing an environment to evaluate their initial idea for a handheld spectrometer. The funding also allowed the team to purchase a small farm, which became their company's R&D headquarters. Three high-risk decisions for three struggling PhD students, but three decisions which spurred the development of an idea which would quickly become viable "It was only through the initial support of the University of Newcastle, the Hunter Medical Research Institute (HMRI), and individual donors that we were able to kick-start a lab and eventually develop the technology that underpins Hone," Antony said.



Figure 1. Photo of Dr. Anthony Martin, the founder of the smarter crop testing hardware and software—Hone.

3. The journey so far

In 2016, Hone was selected for CSIRO's ON Prime pre-accelerator program, to understand market trends and fit to develop their MVP further. "You're constantly thinking, 'in six months' time, it's almost certain this will fall apart', and then it doesn't. Over time it gets more and more stable, and you start getting customers and return business, and you think 'maybe we're okay'," says Antony. Six years on, the Hone team has developed and commercialised their technology, which evaluates the properties of soil, crops, and grain samples in the field without the need for laboratories. Kick-starting their idea while still part of the University of Newcastle ecosystem, gave the co-founders access to talent. Software engineer, Peter Tylee, joined the team early on as Chief Technology Officer, Simon Wheeler conducted lab testing, and Brenton Bray was the hardware engineer.

A string of funding success has provided financial backing, including securing an NSW Government Minimum Viable Product grant, early-stage investment with Hunter Angels, and the Federal Government's Accelerating Commercialisation grant. Most recently, Hone was awarded \$837,000 from the NSW Physical Sciences Fund to further develop its technology in partnership with the Australian Wine Research Institute.

4. Look into the future

The future is limitless for the team at Hone, who have already successfully launched their software component as a standalone product. More than 400 farmers and scientists across Australia are already using Hone's platform to conduct more than 250,000 lab tests, and they have partnered with many of Australia's leading laboratories, including CSIRO. Expecting to launch the handheld spectrometer in 2020 commercially, Hone is aiming to take its product global. The team is already in discussions with some of the largest grain handlers in France, US, and India.

The company



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Siobhan Curran is the Manager of the University of Newcastle's Integrated Innovation Network (I2N), an initiative that drives new venture creation and economic diversity in the Hunter region of New South Wales by connecting innovators and entrepreneurs to the community, coaching, customers, and capital. As the Manager of the I2N, Siobhan is responsible for the delivery of programs for students, staff, alumni, and community that cover everything from foundational enterprise principles for emerging entrepreneurs through to acceleration programs and incubation services for start-ups and scale-ups.

Siobhan holds a Master of Business Administration (Honours) majoring in Innovation and Entrepreneurship from the University of Newcastle. She has extensive experience in building and delivering business development programs, having worked for not-for-profit Renew Newcastle to support creative arts entrepreneurs develop and grow their product and market potential, and now in her role at I2N, supporting both soft-tech and deep-tech start-ups. The I2N has assisted more than 70 teams to accelerate and incubate. Over the last four years, pre-accelerator and accelerator program participants have gone on to incorporate 16 new companies, which to date have raised more than \$6 m in the capital and have created and sustained 31 new jobs. A further 320 programs and events have been delivered to emerging entrepreneurs, pre-start-ups, start-ups, and SMEs, which have attracted more than 7,200 participants, critically driving a networked innovation and entrepreneurship ecosystem in the Hunter region.



Cite as: Samantha Dymond, It Is Not Reasonable to Guess About Pain, Innovation & Impact 2020

URL: <http://iai.digital/2020/paincheck>

It Is Not Reasonable to Guess About Pain

Samantha Dymond

Abstract: PainChek is an Australian-listed company that had developed a new artificial intelligence-based pain assessment tool. Their tool provides healthcare professionals and carers with an objective way of assessing pain in patients who cannot verbalise their pain.

Keywords: PainCheck, artificial intelligence, pain

1. The success story—PainCheck

If you have a loved one with dementia, how do you know whether their behaviour is the result of their condition or if pain contributes? The sad truth is that patients with dementia cannot tell us if they are in pain¹. A common preventative approach has been to sedate patients with challenging behaviours. Prof. Jeff Hughes, PainChek Ltd's CFO, says that having to guess whether someone is in pain is simply unreasonable.

PainChek Ltd is an Australian-listed company that provides electronic pain assessment through a smart device App. Their tool provides healthcare professionals and carers with an objective way of assessing pain in patients who cannot verbalise their pain. The company listed in 2016, acquired its first customer in 2017, and by Dec 2019, expanded to 31,000 beds under a contract with 73,000 completed clinical assessments, reaching a \$200 M market cap. They have extended their operations into New Zealand, Singapore, and the United Kingdom. The company has since secured regulatory clearance in Australia and Europe. As a result of a \$5 M Federal Government grant in 2019, PainChek is currently being rolled out to 100,000 people living with dementia in residential aged care across Australia.

2. Where did it start and the motivation?

The company was initially founded by researchers from Curtin University—Mr. Mustafa Atee, Prof. Jeff Hughes, and Dr Kreshnik Hoti. Operating as clinical pharmacists, the three co-founders witnessed the difficulties experienced by patients' inability to verbalise their pain. Over the years of documenting reviews from thousands of patients in aged care facilities, Prof Hughes observed that patients with dementia frequently experienced an escalation in anti-psychotic drugs to treat their behavioural issues. However, pain medications were little changed, despite the understanding that older people have a higher incidence of pain. This

Samantha Dymond: Curtin University, Perth, WA, Australia

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raised his concern that patients with advanced dementia were not appropriately medicated. Could needless suffering be reduced, and patient outcomes improved through better pain management?

The project began as a PhD project focused on how to improve pain management through better pain assessment. Grants from Dementia Australia supported the research. The team further engaged NViso, a Swiss software company with facial recognition expertise, to build their first smart device app. The collaboration resulted in a new multidimensional pain assessment tool that used both artificial intelligences to automate the detection of pain-related facial micro-expressions and smart automation to collect non-facial pain-related cues.

3. The journey so far

Initial angel investors funded the establishment of a private spin-out in 2014. In 2016, in partnership with Curtin University's commercialisation team, the founders participated in CSIRO's ON Accelerate program, successfully negotiated a reverse takeover to list on the ASX, secured a new Board, and engaged medical device expert, Philip Daffas, as CEO. The company has subsequently raised over \$13m in three capital rounds.



Figure 1. The above photo is of (from left to right) Philip Daffas (CEO), Jeff Hughes (Chief Scientific Officer (CSO)), Scott Robertson (CTO), and Mustafa Atee (Senior Research Scientist/State Account Manager for WA and SA).

4. Look into the future

PainChek's current focus is Australia-wide expansion and international market entry: Europe and the US. The company has initiated the process to obtain FDA regulatory approval in the US. Further, R&D pipeline expansion is underway with a new product specifically targeting pre-verbal children.

PainCheck's CEO, Philip Daffas, advocates start-ups should focus on completing one goal at a time to a high standard, but also be aware of opportunities when they arise. *'...these things evolve and... you have to grab it when it happens and put a focus on it and make it work...'*

With interest from global players in the hospital sector, such as Philips, the PainChek team participated in Philip's accelerator program. This opportunity will facilitate partnership discussions and potentially facilitate their entry into the hospital network.

The company



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Sam Dymond is a Business Development Manager at Curtin University and has more than ten years' experience within the university sector, supporting researchers, identifying, and managing IP, and seeking commercial and community outcomes. She was with Murdoch University for nine years, heading up the commercialisation team from 2011–2017, and during that time, served on the Board of several university spin-out companies. She joined Curtin University's commercialisation team in April 2019 and has also consulted as a professional writer, writing Impact Case studies and other documents for the university sector.

Sam is a graduate of the Australian Institute of Company Directors and holds a Bachelor of Science (Physics) from Murdoch University, a Master of Business Administration from Curtin University. She is currently studying a Graduate Diploma in Writing and Literature at Deakin University. Sam's background includes various roles within the Commonwealth Government, assessing, guiding, and assisting businesses to apply for Innovation programs, such as Patents, the R&D Tax Concession, and various granting programs.



Cite as: John Kurek, Peter Devine, Spinifex Pharmaceuticals—

Australia's Most Successful Venture Capital Biotech Exit, Innovation & Impact, 2020

URL: <http://iai.digital/2020/spinifex>

Spinifex Pharmaceuticals—Australia's Most Successful Venture Capital Biotech Exit

John Kurek, Peter Devine

Abstract: Spinifex Pharmaceuticals was a spin-off of the Australian biotech company Spinifex in 2014, which was a significant step forward in the development of a new treatment for chronic neuropathic pain. Today, its lead drug, EMA401, has been approved for use in the treatment of painful post-herpetic neuralgia and painful diabetic neuropathy.

Keywords: Spinifex, neuralgia, neuropathic pain, diabetic neuropathy

1. The success story – Spinifex

Over the past 25 years, there has been an extensive global research effort to understand neuropathic pain and develop new drugs for what is still a significant unmet clinical need. Current treatments such as opiates are addictive, and others such as gabapentin are repurposed psychiatric drugs that have side effects that are not effective in a significant number of patients. With their novel approach, Spinifex identified a pain receptor located outside the brain. Spinifex's lead candidate, EMA401, represents a potential first-in-class treatment for chronic neuropathic pain, without the side effects usually associated with drugs that enter the brain and the central nervous system.

2. The Journey so far

Spinifex is a University of Queensland spin-out company, established in 2005. The initial Series A investment round was led by Uniseed and Symbiosis, with GBS Venture Partners joining the round later that year. In 2008, these investors participated in a follow-on round and were joined by Brandon Capital Partners. In 2010 and 2012, Spinifex closed two following financing rounds to complete the preclinical development and the first-in-man clinical trials for their lead drug. The company also received support from Australian Government programs, including the Pre-seed Funds, Innovation Investment Fund (IIF), and Innovation Investment Follow-on Fund (IIFF), Commercial Ready, and the R&D Tax Incentive. In mid-2012, the company published positive results from their phase 2 clinical study in patients with painful postherpetic neuralgia (shingles), a study that was also published in the prestigious medical

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journal "The Lancet" ¹. The operations relied on an established virtual model with two full-time staff who were managing several external consultants to cover the preclinical, regulatory, and clinical aspects of the drug development program. To move to the next stage of clinical development, it was clear that significant additional funds would be required. To that end, in mid-2014, the company raised US\$45m in a Series C funding round from existing investors and top tier US VC's; Canaan Partners and Novo Ventures. The company also set up an office in Stamford, CT, to be closer to the pharma partners who would have an interest in the program. A larger management team led by CEO Dr Tom McCarthy was put in place, and preparations began for pivotal phase 2b studies in neuropathic pain conditions, while in the background, commercial discussions were also underway with potential commercial partners. This led to the deal in June 2015, where Spinifex was acquired by the Swiss multinational pharmaceutical company, Novartis. The deal included an upfront payment of US\$200m, providing significant multiples for the funds invested. In addition, milestone payments of up to US\$500m were also included in the deal. At the time, this was the most successful venture capital biotech exit in Australian history.



Figure 1. Professor Maree Smith (centre), with Johnson & Johnson Medical CEO Gavin Fox-Smith and AusBiotech CEO Dr Anna Lavelle.

3. Look into the future

Following the acquisition, Novartis continued developing EMA401 through two key Phase 2b clinical trials in patients with postherpetic neuralgia and painful diabetic neuropathy. However, the trials, which included clinical sites in Australia, were discontinued in early 2019. While this was incredibly disappointing, it does highlight the risk of drug development where only a small number of drugs that are discovered and developed actually reach the market. It takes time, requires resilience and perseverance, and a team of people with diverse skill sets all pulling in the same direction. We should also not forget the importance of the Spinifex deal (and the two others Uniseed has invested in—Fibrotech & Hatchtech) to the Australian biotech industry, which resulted in a return on investment capital to the sector and increased

Government support following several difficult years after the global financial crisis. In addition, scientists like Maree Smith should be celebrated as they serve as great role models for Australian scientists and open doors for others in the biotech and innovation sector.

The company



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John Kurek is the Biotechnology Investment Manager at Uniseed, Australia's longest-running venture fund, operating at the Universities of Melbourne, Queensland, Sydney & New South Wales, and the CSIRO, with investment capital provided by these research organisations. At Uniseed, John is responsible for identifying new investment opportunities from the five research partners, and also covers



Uniseed's overall biotechnology and life sciences portfolio. Uniseed has returned significant capital to its investors, including Novartis acquisition of Spinifex for US\$700m; Shire plc acquisition of Fibrotech Therapeutics for US\$557m; and Hatchtech sale to Dr Reddy's Laboratories for ~US\$200m.

John brings 20 years of industry experience as a Biotechnology Manager with a focus on the strategic design and implementation of drug development programs. John's previous roles have been with ASX listed biotech companies BioDiem Ltd and Amrad Corporation Ltd., where he was responsible for the management of preclinical and early clinical stage drug development projects. His experience extends from late drug discovery to the phase I-II clinical phases of drug development. John's experience covers a range of areas, including 1) Acting as Director on investee company boards, 2) Biotechnology project management, 3) Investment analysis and due diligence, 4) Financial modelling, 5) Intellectual property management, 6) Business development, 7) Risk management, and 8) Relationship management.

John has a PhD in Neuroscience and a Post Graduate Diploma in Drug Evaluation & Pharmaceutical Science, both from the University of Melbourne, and is a graduate of the Australian Institute of Company Directors.

Peter Devine is CEO of Uniseed and has extensive experience at board and executive management levels in the commercialisation of early-stage technologies, having held senior R&D, business development and commercialisation positions in several Australian companies and Australian universities. Has served on the Board of numerous start-ups which have collectively raised over AU\$300m, with a number of these being successfully sold to large multi-nationals in deals collectively worth over AU\$1.75b.



Peter holds a PhD from the University of Queensland and received the Dean's Prize for his MBA studies at the Australian Graduate School of Management. He is a Graduate and Fellow of the Australian Institute of Company Directors and holds a Diploma of Financial Services (Financial Markets) and a Graduate Diploma in Applied Finance from Kaplan Professional. Peter was previously VP of Business Development at ASX-listed Progen Industries Ltd. He was Research, Development and Commercialisation Manager at Brisbane-based PanBio Pty Ltd from 1996 to 2000, which ultimately was sold to Inverness Medical. He received a Federal Government Centenary Medal in 2003 for outstanding contribution to the business of biotechnology.

Recent Uniseed successes include Fibrotech Therapeutics' sale to Shire in 2014; the Spinifex Pharmaceuticals sale to Novartis in 2015; the Hatchtech sale to Dr Reddy's in 2015 and FDA approval in 2020; the Smart Sparrow sale to Pearson on 2020 and Exonate's collaborative agreement with Janssen in 2020.

Cite as: Luke Deacon, AI and Machine Learning Help Reduce Theft, Waste, and Time at Supermarket Checkouts, Innovation & Impact 2020
URL: <http://iai.digital/2020/tiliter>

AI and Machine Learning Help Reduce Theft, Waste, and Time at Supermarket Checkouts

Luke Deacon

Abstract: Tilter is an Australian technology start-up that developed an artificial intelligence-powered scale that automatically recognises fruit and vegetables at supermarket checkouts. Tilter Vision Scales used with Woolworths' Scan&Go app is now available at select Sydney and Melbourne-based Woolworths stores.

Keywords: Tilter, machine learning, supermarket checkouts.

1. The success story—Tilter

Tilter is an Australian technology start-up providing accurate and flexible identification systems using the latest in AI, machine learning, and computer vision. The device was developed to automatically recognise fruit and vegetables at the supermarket checkout, removing the need for manual selection and barcoding. With locations in Sydney, Munich, and New York, Tilter is helping retailers across the world improve their processes and meet market needs.

2. Where did it start and the motivation?

Tilter was founded in September 2017 by three friends Marcel Herz, Christopher Sampson, and Martin Karafilis. The three co-founders fostered their relationship while pursuing graduate studies with a focus on the applications of machine learning in medical imaging.

The company started as an idea, aimed at helping solve the inefficiency of scanning fresh produce at self-service checkout counters—given many fruits and vegetables are similar in shape or variety. The team dynamics was established in the early stages of the company building with Marcel acting as CEO, Chris as the CTO, and Martin as the COO. Over the last three years, the team's experience and drive have allowed them to successfully execute their vision of a multinational company.



Figure 1. From left to right: Tiliter founders—Marcel Herz, Martin Karafilis, Christopher Sampson presenting the latest in artificial intelligence for your next Scan&Go shop and experience a quick and seamless way to scan fresh produce.

Barcoding fruits and vegetables require a substantial amount of plastic packaging. With sustainability goals becoming a major focus of most corporations, Tiliter aims to ultimately replace the need for barcodes via 'smart checkouts'. Revolutionising the checkout process will transition the consumer shopping experience into the future with a faster, easier, and smarter supermarket checkout. Tiliter will digitise the shopping experience for consumers, reduce shopping times, and reduce plastic waste.

The Tiliter Vision product recognition technology is powered by computer vision and deep learning algorithms to accurately identify products without barcodes. Deep learning is an enhanced version of machine learning which facilitates the delivery of extremely accurate results with minimal data sets.

Tiliter systems comprise a processor unit and a camera head with lighting. The added advantage is that the camera head can be easily integrated into any existing checkout technology such as self-service checkouts, assisted checkouts, and scan&go, eliminating the need for a change of the core operating system. The Vision Scales have been deployed in Select Woolworths stores in Sydney, which use the Woolworths developed Scan&Go app to remove checkout friction when shopping. For example, when the customer places their Hass avocado on the scale, the camera takes an image, and the processor unit powered by AI recognises it as a Hass avocado. On the display screen, a barcode will appear for customers to scan and add the Hass avocado to their digital Scan&Go cart. This can all be done in less than three seconds, with the actual recognition process happening in under one second.

Tiliter sells its hardware and software solutions directly to retailers, manufacturers of checkouts, and checkout components, point of sale software providers, and distributors. The software is a low yearly subscription fee whilst the hardware can be purchased outright.



Figure 2. The Tiliter team at UNSW.

3. The journey so far

Having worked solely for large corporates following university, the founding team joined the Founders 10x program at UNSW to learn from those with knowledge and skills in the start-up community.

Tiliter has been collaborating with the likes of Retailtech Hub powered by Plug and Play based in Munich, helping the company grow its base in Europe. The Tiliter team has received much industry recognition from being named in Webit Festival's Top Six Companies and Hello Tomorrow's Top 100 Start-ups globally, to winning That Startup Show Season 2, and more recently, Grow New York. Most recently, Martin was included in the Forbes 30 Under 30 Asia 2020.

The founders have built partnerships with leading providers of scanners and POS systems, which have been key to rapid global scalability—Tiliter Vision Scales used with Woolworths' Scan&Go app is now available at select Sydney and Melbourne-based Woolworths stores.”

4. Look into the future

Tiliter's team of 22 people manages its operations in the Sydney, Munich, and New York offices. The company aims to expand on all fronts continuing to build a presence in other markets and locations with more employees and customers.

The company



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Luke Deacon is Senior Manager Founder Programs at the University of New South Wales (UNSW). Luke is an experienced leader having designed and run a start-up and scale-up programs in both the university and government sectors. Luke is a non-executive director and serves on the Board of Cicada Innovations and is a Member of the Australian Institute of Company Directors (AICD).

He previously led the Australian Government's \$14.2m Landing Pads program helping hundreds of start-ups go global, including access to new customers, mentorship, and investors in San Francisco, Tel Aviv, Singapore, Shanghai, and Berlin.

Luke currently leads the UNSW Founders team delivering a suite of programs, including the New Wave Incubator driving an increase in female founders, the Pre-Accelerator program, UNSW's flagship 'Founders 10x' accelerator, and the successful expansion to include 'Health 10x', in partnership with The George Institute for Global Health and Global Programs. Luke is responsible for the UNSW start-up incubation space and Founders Fund, which invests in UNSW accelerator start-ups. Luke has overseen the growth of UNSW programs to deliver entrepreneurship programs at scale



VALD—A Measured Success

Andrew Leech

Abstract: VALD is a QUT-based company internationally known for its development of human measurement technology, including screening, monitoring, rehabilitating, and training athletes. It's main products include the NordBord, ForceDecks, HumanTrak, and Airbands.

Keywords: VALD, NordBord, athletes, screening.

1. The success story—VALD

VALD Performance is a world leader in the development of human measurement technology for screening, monitoring, rehabilitating, and training athletes. Their first product, the NordBord, was revolutionary in that it delivered a precise measurement of the hamstring strength as a method for predicting and avoiding muscle injury. VALD's success builds on a suite of products that are trusted by elite Australian and international sporting teams, research institutions, and allied health professionals.



Figure 1. An athlete performing a Nordic Hamstring Curl. Most of NordBord's research on hamstring strength as it relates to hamstring injuries focuses on eccentric strength displayed during this exercise.

2. Where did it start and the motivation?

VALD was Founded in 2014 at the Queensland University of Technology by an initial team of three best mates working out of a kitchen bench.

The initial success was marked by the commercial launch of the NordBord hamstring testing system in 2016; then after, VALD rapidly gathered momentum, acquiring, developing, and launching multiple other products, such as the ForceDecks dual force plate system, the HumanTrak movement analysis system, and the AirBands wireless blood flow restriction cuffs.



Figure 2. The NordBord measures approximately 3 feet by 2 feet, with much of its surface covered by a pad for athletes to kneel on. Positioning is easy, with athletes slipping their ankles into the padded, ergonomic ankle hooks.

3. The journey so far

Today, the company has grown to form an international network of more than 70 offices all around the world. Within five years of the commercial launch, the company had scaled up to sixty staff. The bond between the initial team was pivotal in promoting such a development—each member of the team brought their own complementary skills, and their pre-existing friendship allowed them to push through difficult times and complex problems. This was further stressed by the CEO and co-founder, Laurie Malone—"We would've had limited results with just one of us, some success with two, but could only truly be where we are at now with all three."

The key to VALD's growth was the support from funding grants. Specifically, the Advance Queensland Business Development Fund, Brisbane Lord Mayor's Global Entrepreneur Grant, and Austrade's Export Market Development Grants were some of the crucial early pieces that helped VALD gain momentum.

VALD was also one of the first companies to be part of QUT's Bluebox's accelerator. It was here that co-founder Sam James made the pivotal early connection with the inventor of the NordBord. Bluebox was fundamental in facilitating the initial meeting and helped leverage it into the business VALD is today.

4. Look into the future

VALD is further expanding its team to recruit 24 new staff globally, with over half being based in their Brisbane HQ. This extra talent will help with the additional development of their end-to-end human measurement platform. They are also preparing for a series A round of funding.

The company



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Dr **Andrew Leech** is the Director of Industry Engagement at QUT and has extensive experience in the commercialisation and licensing of early-stage technologies, having held executive management and commercialisation positions in several Australian universities and Australian companies. He has transacted on a multitude of licenses in healthcare and has served on the Board of several start-ups in the biotech and medtech sectors.

Andrew is a registered Patent and Trademark Attorney; he holds a PhD in Biochemistry from the University of Queensland and a Masters Industrial Property Law from the University of Technology Sydney. Andrew has served as the CEO for QUT Bluebox Pty Ltd and SmartArm Pty Ltd and has an excellent track record of licensing and capital raising at several Australian universities and medical research institutes.

Recent successes include an eight-figure Series A for a cancer therapeutic company, licensing of a 3D-printed bone implant technology to an ASX-listed company, and a Series A for an innovative filter mask technology, all in 2020.



Editorial Information

Journal Editors

Dr **Grzegorz Liskiewicz** is a researcher, entrepreneur, science popularizer. He works at the Institute of Turbomachinery, Lodz University of technology. He is working on the design and safety of centrifugal compressors with the goal to make industrial compressors safer and more economic. He graduated his PhD from University of Strathclyde, and visited University of Oxford, Cambridge, Leeds. Grzegorz serves as the Rector's Proxy for Academic Entrepreneurship, and board of directors member in the University Technology Transfer Center Ltd. In years 2018-2020 Grzegorz served as the board of directors member in the Top 500 Innovators Association Poland.



In 2011 Grzegorz co-funded ACADEMYA, company providing solutions for polish authors of research papers. Nowadays, the company is a polish leader in the field.

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Prof **Barbara Jachimska** is an Associate Professor at the Jerzy Haber Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences. She has M.Sc. in Material Engineering and Ceramic and M.Sc. in Environmental Protection from AGH University of Science and Technology. She holds a Ph.D. with honours in chemistry and Doctor of Sciences (habilitation) both received from Jerzy Haber Institute of Catalysis and Surface Chemistry in 2001 and 2012, respectively. Barbara Jachimska works in the area of polymers, proteins and the assembly behaviour of biopolymers, especially study adsorption, adhesion and interfacial phenomena in the nano-colloidal system. She had many internships abroad, among others in Germany, France, China, and the UK. She participated in the implementation of tens of research projects. The results of her study were presented at many international conferences, and she is co-author more than 70 articles published in international journals. In 2015 was awarded the scholarship from Polish Ministry of Education "TOP 500 innovators" program organized jointly by the University of Cambridge Enterprise and Oxentia (Oxford University). Organizer of many international conferences and workshops, and co-organizer of events devoted to technological innovation. Expert in the Regional Operational Programme of the Malopolska Region for 2014- 2020 Regional intelligence Specialization (RIS): Life Sciences, Chemistry.



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Dr **Karolina Zapadka** is the head of Babraham Accelerator at Babraham Research Campus. Karolina joined the Babraham Research Campus in 2018 where she co-founded and successfully delivered the Accelerate@Babraham initiative. As part of the initiative, Karolina launched the first life science acceleration programme for early stage ventures combining access to lab space, mentoring from business and scientific experts and access to investors in the Cambridge Cluster.

Karolina's strong interest in life science entrepreneurship and expediting treatment to patients motivated her to join the Oxbridge Biotech Roundtable in 2013 where she launched the OneStart competition. She then co-founded and became Chief of Staff at the Global Innovation Forum and IMAGINE IF! accelerator in 2014. This experience enabled her to develop strong relationships with various partners regionally, nationally and internationally – including investors, academic leaders, senior managers and CEO's of biotech and big pharmaceutical companies.

Karolina has over 7 years experience in building healthcare companies within the Cambridge Cluster. She played a pivotal role in securing over £8.5 million for a number of British early stage ventures (pre-seed and seed stage) from a stellar syndicate of investors (business angels and VCs). She started her career as a scientist in protein and peptide therapeutics at a leading biopharmaceutical company developing a portfolio of products to enable improved treatments for diabetes care. Karolina completed a PhD in Biophysics at the University of Cambridge and carried out her Postdoctoral work at AstraZeneca (MedImmune).

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Issue Editors

Dr **Rabab Nasrallah** is an investment analyst with Earlybird Venture Capital based in Germany, with a major focus on investments in the health care space. Prior to this role, Rabab was the program manager for the INCUBATE accelerator based at the University of Sydney, Australia. With an extensive research background, Rabab has held roles in leading global research organisations in Australia and the UK, including The George Institute for global health, Lowy Cancer Research Centre, Cancer Research UK, and Cambridge University.



Rabab has a PhD in regenerative medicine from UNSW, Australia. Following her postdoctoral fellowship at the Babraham Institute, Cambridge, she published a first author Nature paper in 2020.

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Dr **Fatima Nasrallah** is an associate professor at the Queensland Brain Institute, at the University of Queensland in Australia. She works in the development of imaging methodology for clinical applications, mainly Magnetic Resonance Imaging for advancing state-of-the-art methodology for healthcare use.



She graduated from the University of New South Wales in Sydney and then moved to A*STAR Biomedical Sciences in Singapore where she collaborated with pharmaceutical companies like Merck Sharp & Dohm Corp. and GlaxoSmithKline.

In 2020, she was awarded a \$1.76m medical research future fund to the development of imaging and fluid-based biomarkers for the prediction of patient outcome following injury and concussion.

She is a research neuroscientist, a scientific writer, and an editor for a number of journals, including Frontiers in Neuroscience and Scientific Reports.

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Editorial

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