

Physical Sciences Fund 2022

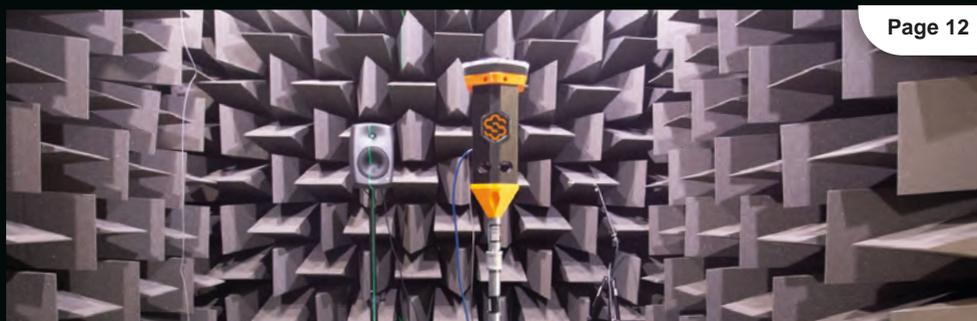
Fishburners, Sydney Startup Hub

Wednesday 7 December 2022





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Physical Sciences Fund 2022

Announcement Event

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Introduction

Master of Ceremonies: Dr Abbie Widin, co-founder, Defy-Hi Robotics

Acknowledgement of Country

Keynote Address

The Honourable Alister Henskens SC MP, Minister for Science, Innovation & Technology

NSW Chief Scientist & Engineer Address

Professor Hugh Durrant-Whyte

Physical Sciences Fund 2022 Video

Announcement of Successful 2022 Funding Recipients

Professor Annabelle Duncan, Chair, Physical Sciences Fund Expert Panel,
The Hon. Alister Henskens MP

Discussion with Recipient Panel



Message from the NSW Minister for Science, Innovation & Technology

It has been an exciting year for research and development in NSW and one that I've been proud to oversee as Minister for Science, Innovation & Technology. In May, the NSW Government unveiled the *20-Year R&D Roadmap*, our long-term strategy to focus our best opportunities to invest in and turn our state's R&D capabilities into new industries, products, jobs and services.

This year's budget featured a historic level of investment in accelerating R&D and commercialisation through the Future Economy Fund. Several important research translation programs either commenced or continued, turbocharging R&D through the Small Business Innovation & Research program, Bushfire Commercialisation Fund and Bushfire Technology Pilots Program, and the Tech Central Research and Innovation Infrastructure Fund.

The State government is committed to supporting our best and brightest people, whether they be world-class researchers in our universities or entrepreneurs launching their own startup, to tackle the many significant challenges facing NSW with innovative solutions.

The Physical Sciences Fund (PSF) exemplifies this mission. Now in its fourth year, the \$5 million PSF provides continuing financial and

entrepreneurial support to startups to accelerate the translation of research into devices and systems ready for commercialisation, giving each funding recipient the best chance of growing into a successful company.

This year, we are supporting four companies tackling challenges in agriculture, construction, energy and communications. Two of our recipients have already reached major milestones through previous funding rounds of PSF, with one recipient receiving significant international financial backing and the other receiving funding support from Australia's leading telecommunications company and one of its largest agribusiness companies.

Such early successes are a tremendous endorsement of the effectiveness of this program and so it gives me great pleasure to announce today that the program's total funding will be doubled to \$10 million for its fifth round in 2023. This commitment from the NSW Government will ensure researchers and startups continue to reap the benefits of the PSF, creating new technologies that will help secure a brighter future for the people of NSW.

The Hon. Alister Henskens SC MP



Message from the NSW Chief Scientist & Engineer

NSW has no shortage of world-leading R&D throughout our universities, institutes and tech businesses. But having a great idea is one thing, translating that into a commercially viable product or service with real-world benefit is another, and it can be tough out there for early-stage companies. One of my priorities as the NSW Chief Scientist & Engineer, and the goal of the PSF, is to support NSW business to navigate the ‘valley of death’ and get them to a stage where they can attract private investment and equity. This ensures greater economic activity in NSW, with better outcomes for the people of the State, Australia and the world.

This year has been particularly exciting in terms of investment in R&D in NSW, with the announcement of historic levels of funding to deliver the Future Economy Fund, which will target key sectors such as quantum computing, manufacturing, medtech, and defence and aerospace. This year also saw the announcement of \$119 million over 10 years for local RNA research, and \$96 million for the RNA Pilot Manufacturing Facility.

Another huge milestone was the launch of the NSW 20-Year R&D Roadmap in May, which provides a framework to better target our

R&D investment so we can fast-track our capabilities in new technology and innovation.

In its fourth year, we can clearly see the benefits the PSF has for local business and growing a range of innovative industries in NSW. To give just a few examples of the success stories we are seeing from this fund, since receiving PSF funding in 2020, MicroTau recently received \$5.6 million in investment to use its shark skin-inspired microscopic film to reduce surface drag on aircraft. AgTech startup Hone – a recipient in 2019 – was able to raise over \$6 million in investment in its Series A round late last year. Another 2020 recipient, BioScout, this year received \$3 million in seed finance to expand their airborne crop disease monitors across Australia and the globe.

Congratulations to this year’s successful companies. Being awarded this funding is testament to your vision and hard work and I thank you for the work you are doing for the benefit of NSW. I look forward to following your journeys as you grow your businesses.

Professor Hugh Durrant-Whyte



Message from the Chair of the NSW Physical Sciences Fund Expert Panel

It's been a pleasure once again to lead the PSF Expert Panel, now in its fourth year. Strange to think that the event to celebrate the recipients of the PSF's inaugural round was held in December 2019, just before our world changed dramatically.

Medical science moved swiftly to tackle the challenge of the Covid-19 pandemic and it's been exciting to witness the innovations presented and developed across the physical sciences since the Fund commenced. In previous years we have supported a total of 16 projects and this year a further four are receiving funding.

In 2022, we see the return of two companies previously funded through the PSF. A 2021 funding recipient aiming to make green hydrogen production more viable is being supported to further develop their technology. A 2020 recipient previously supported for their system to improve regional mobile phone connectivity is now developing technology to improve connectivity in connected and autonomous vehicles.

Other projects we celebrate tonight are improving environmental monitoring on construction sites and technology that uses AI to

reduce food waste by providing land managers with on-farm yield predictions.

A big welcome to our Expert Panel's newest member, Professor Renate Egan, who leads the UNSW Sydney activity in the Australian Centre for Advanced Photovoltaics and who has led manufacturing and industrial technology development of energy technologies in Australia, Germany and China. Thank you as always to existing Expert Panel members Martin Duursma, Dr Simon Poole AO and Professor Tony Weiss AM. Thanks must also go to the PSF Sub-Committee, who helped us to assess applications and refine our review – work that helps us immensely.

Finally, the PSF would not be the success it is today if not for the passion and advocacy of the NSW Chief Scientist & Engineer, Professor Hugh Durrant-Whyte, and the support provided by his team at the Office of the NSW Chief Scientist & Engineer.

Professor Annabelle Duncan PSM



“Green hydrogen is a vital energy vector that will decarbonise the hardest to abate sectors, but lowering the cost of green hydrogen remains a challenge in getting the industry to scale. We are proud to be scaling up our high efficiency electrolyser that will deliver the world’s lowest cost green hydrogen by 2025, accelerating global decarbonisation.”

– Paul Barrett

WOLLONGONG-BASED HYSATA HAS developed a new water electrolyser that promises to deliver the world’s lowest cost green hydrogen, through a process that splits water with renewable electricity. This technology gives NSW and Australia the potential to be a world leader in green hydrogen production, which is expected to be a critical pillar of the net zero global economy.

The company’s ‘capillary-fed’ electrolyser is around 20 per cent more efficient than other electrolysis systems and its simple design makes it cheap to manufacture and easy to scale – factors that are critical to commercialisation. The high efficiency is achieved by several innovations, the most important being the elimination of gas bubbles on the electrodes during water splitting.

The development of Hysata’s current system was supported in part by a PSF grant in 2021, which helped to test and optimise electrodes and increase hydrogen output. As it stands, the system is already considered a breakthrough in the green hydrogen sector, attracting \$42 million in investment from around the globe.

Hysata will use its 2022 PSF funding to optimise the membrane component of its electrolyser, which will significantly increase hydrogen output and further strengthen its commercial viability.

Hysata Pty Ltd

Stage/Category:

Early stage/Device development and manufacture

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“Spending over a decade on major construction projects across the world, I’ve seen the lack of innovation in environmental management become a significant hindrance to project success. SiteHive gives managers eyes and ears across their sites, allowing them to make quick, confident decisions from wherever they are, and proactively prevent potential environmental incidents occurring.”

– Ben Cooper-Woolley

ENVIRONMENTAL MONITORING AND management is a key part of all significant construction projects, with increasing pressure from clients, stakeholders and the community to ensure projects transparently comply with environmental regulations. However, current technology is largely analogue and costly, providing only retrospective data.

SiteHive has developed a digital, multi-sensor monitor that measures noise and dust for construction projects, providing continuous real-time data, including images and audio, in one device – known as the Hexanode – supported by innovative online software.

The device harnesses emerging research and technologies in micro-electromechanical systems (MEMS)-based sensors to provide improved monitoring at a lower cost, reducing environmental incidents and delivering better environmental outcomes.

It also includes innovative features such as directional noise monitoring, cameras and audio capture to identify sources. Designed specifically for construction sites, it is compact, highly mobile and able to withstand the rigours of daily site use and weather.

The Hexanode is easy to set up and use, requiring no technical knowledge, and is internet-enabled to provide real-time data to SiteHive cloud-based software, meaning different teams can collaborate remotely with live data from a site, from wherever they are. Stakeholders and communities can also use the real-time data and SiteHive software to track projects to ensure they operate within regulatory limits.

SiteHive

Stage/Category:

Growth/Scale up/Device development and software

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Agrifood Optimisation Platform



“Our crop recommendations and harvest predictions are a customer’s blueprint on how to grow crops more profitably and with less environmental impact, enabling their business to scale faster and reduce climate risk.”

– Ros Harvey

FOOD WASTE COSTS the Australian economy over \$36 billion each year, with around 25 per cent of Australian crops never even leaving the farm due to pests, disease, handling or weather. The Yield is an agricultural technology company that use scalable digital technology to reduce the impacts of uncertainty created by weather on food waste across the entire food supply chain.

The Yield’s ‘Digital Playbooks’ provide land managers with on-farm yield predictions and recommendations using AI based on real weather data and the agronomical needs of crops. This allows its customers to do more with less, with an average 10 per cent increase in farmgate value.

The Yield’s systems have already seen success being applied to high-value industries, including wine, table grapes and apples, providing recommendations on crop protection and harvest scheduling using crop prediction models developed in collaboration with the Food Agility Co-operative Research Centre and the University of Technology Sydney.

PSF funding will allow this technology to be expanded in both application and scope – providing models to optimise crop planning based on broader supply chain needs, allowing them to better predict what produce is needed and when. This will ensure less waste, reduced resources and more value from crop production.

The funding will also allow for predictive models and tools to be developed for a broader range of crops, with a focus on specialty crops (trees, vines and vegetables) where there is strong competitive advantage in developing innovative technology.

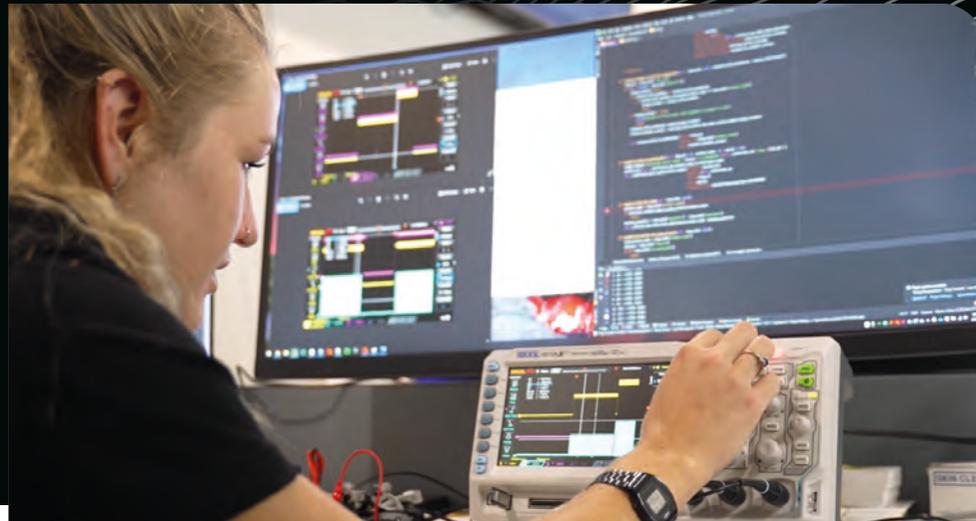
The Yield Technology Solutions

Stage/Category:
Early stage

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“The ZetiLink platform represents a major step forward for vehicular radiofrequency (RF) technology - taking it from a basic signal receiver to a modern antenna array and RF control module that uses machine learning to actively and intelligently determine the optimal configuration for the vehicle.”

– Dan Winson

ZETIFI – A 2020 PSF recipient for their ZetiCell and ZetiRover connectivity solutions – will continue the development of ZetiLink, a new platform technology that provides the connectivity performance required by the rapidly growing connected and autonomous vehicle market.

The automotive industry has invested heavily in connectivity-reliant features yet little attention has been paid to improving the range and data throughput of the vehicle antennas that these connected systems rely on. Vehicle antennas have barely changed since the 1930s and the inadequacy of this legacy technology presents a serious barrier to the widespread adoption and successful operation of autonomous vehicles and other connected features.

ZetiLink modernises vehicular connectivity by leveraging the power of IoT, machine learning and advanced electronics. Improved range, reliability, throughput and latency is achieved via novel antenna arrays and machine learning that informs location-aware RF control modules in the vehicle. Multiple connections are controlled in real-time by intelligent path selection for available connection options.

The superior connectivity of ZetiLink will serve the global connected and autonomous vehicle market by ensuring that vehicles are better able to ‘talk’ with each other and external networked devices, delivering improved safety, efficiency, cost and sustainability outcomes.

Zetifi

Stage/Category:

Growth stage start-up/Device development and manufacturing

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Physical Sciences Fund Expert Panel



The Expert Panel to oversee and assess the PSF applications is composed of distinguished experts who collectively have skills, experience and expertise in science and engineering, devices and systems commercialisation, venture capital, financial management and consumer advocacy. The Panel composition reflects a strong focus on end-user needs.

The following people were approved by the then-Minister for Trade & Industry, the Honourable Niall Blair MLC, to be members of the PSF Expert Panel. Professor Renate Egan replaced Professor Rose Amal in 2022.

Professor Annabelle Duncan PSM Chair

Current Chair of the Sydney School of Entrepreneurship's Board of Directors, Annabelle was the Vice-Chancellor and CEO of the University of New England (UNE) from 2014 until 2019. Prior to joining UNE, Annabelle spent 16 years at CSIRO, including six as Chief of the Division of Molecular Science.

She has acted as an advisor to the Department of Foreign Affairs and Trade on biological weapons control, representing Australia at international arms control meetings and acting as a biological weapons inspector with the United Nations in Iraq.



Mr Martin Duursma

Martin is a Partner at Main Sequence. He has a passion for deep tech investing and bringing the best of research to full commercialisation, with a focus on space and renewable energy.

He has over 25 years of experience as an entrepreneur, technologist and business leader. His experience as a founder of Datapac and then as head of the CTO Office and Labs at Citrix has given him a unique insight into how companies need to navigate the technology to successful product journey.



Professor Renate Egan

Renate leads the UNSW Sydney activity in the Australian Centre for Advanced Photovoltaics. In 2022, she was recognised in the Australian Solar Hall of Fame for her extraordinary contribution to solar research, industry development advocacy and communications, and was earlier named as one of Eight Great Women in the Business of Science and Solar by Renewable Energy World.

Renate has led manufacturing and industrial technology development of energy technologies in Australia, Germany and China, and is Co-Founder of Solar Analytics. Renate now participates on several national and international panels, boards and review committees across the energy sector and represents Australia on the Executive Committee of the International Energy Agency Photovoltaic Power Systems program.



Dr Simon Poole AO

Director and VP Business Development at Cylite Pty Ltd, Simon is an engineer with 40 years' experience in photonics in research, academia and industry.

A leading technologist and entrepreneur in optical communications, he is highly experienced in startups and is renowned for both his contribution to the technology of photonics and the companies he founded (Indx, Engana, Cylite), which have generated over \$2 billion in revenues to date.



Professor Tony Weiss AM

McCaughey Chair in Biochemistry, Professor and NHMRC Leadership Fellow at The University of Sydney, Tony's research is on tropoelastin and elastin, the biological ingredients that give human tissue its elasticity. He is an inventor on 169 granted patents in 22 families and is commercialising treatments that decrease scarring and accelerate the repair of wounds.

Tony was awarded the Prime Minister's Prize, NSW Premier's Prize, Eureka Prize and Australian Academy of Technology & Engineering's Clunies Ross Medal among his many other awards in recognition of his translational science. This includes the founding of Elastagen, which four years ago was acquired for the sum of \$340 million by Allergan, with the products rapidly moving to market. Elastagen was one of the first recipients of a grant through the NSW Medical Devices Fund.

Physical Sciences Fund Sub-Committee

Erik W Aslaksen Independent Researcher

Erik has over 50 years' industrial experience covering fields as diverse as microwave components, power electronics, quantum electronics and communications, ranging from basic research to corporate management. Erik has been at the forefront of developing the system approach to engineering, with an emphasis on life-cycle costing and a design optimisation process based on a holistic definition of cost-effectiveness; more recently he has been applying the system approach to society as a complex system.

Associate Professor Maryanne Large

Innovation & Commercialisation, The University of Sydney

Maryanne is a physicist, working in optics and materials science. She has research experience in both academia and industry (Canon and her own start-ups). Since 2013 she has been based at The University of Sydney, where a large part of her role is helping postgraduate students develop the skills for research translation. Her "Inventing the Future" program has resulted in students developing several highly successful start-up companies, including Regrow and Earth AI.

Leong Mar Commercial, CSIRO

At CSIRO, Leong manages the commercial engagements and commercialisation of technologies developed by a number of the business units and strategic initiatives like the Missions Program. He is also the CSIRO representative on the Investment Committee of Uniseed Investments. Previously, Leong spent 10 years with DuPont where he held several roles including Manager of the ANZ Technology Centre and leading Corporate Business Growth and Innovation. During this time, he led the development of multi-award-winning product and service solutions for the mining industry. Leong has also worked in several technology start-ups.

Alexandra Meldrum

Vice President Learned Society, Institution of Chemical Engineers

Alexandra is a professional engineer, economist and non-executive director. She leads the international technical strategy and policy for IChemE. Alexandra has 25 years' management experience in government, industry, academia, the not-for-profit sector and has worked in the international food, manufacturing and energy industries. She consults and teaches strategy, economics, change management and sustainability at university business schools. Alexandra was Principal Advisor, Productivity Commission at NSW Treasury and Manager, Strategic Projects at NSW Department of Industry. She has led strategy development, managed operations, created processes for delivering innovative new services and products and led transformational change of strategy, governance, structure and culture. She brings expertise in strategy, transformation, governance and education.

Bernard A Pailthorpe Applied and Computational Physicist

Bernard has built his career on theoretical and computational modelling of materials. Currently he is an Honorary Professor of Physics at The University of Sydney. He has held numerous research grants in Australia and the US and served on grant review panels in both countries. Bernard also chairs the Bushfire Commercialisation Fund Sub-Committee. He has contributed to advanced computing research infrastructure for two decades and has held two CEO-level positions, in Sydney and Brisbane.

Natasha Rawlings Previously Investment Manager, Uniseed

Natasha is a tech entrepreneur who has led, founded and mentored early and mid-stage tech start-ups, with a particular focus on creating revenue through sales, marketing and product development. Prior to this, Natasha had a successful career in marketing and product development, holding top management positions in Australian and UK companies. Natasha's previous roles include CEO and Founder of StreetHawk, a mobile relationship management platform and along with being an investment manager at Uniseed, she was also a director of four startups - Forcite Helmets, Wildlife Drones, Cardihab and BioScout.

Note: Natasha participated in the 2022 PSF sub-committee assessment process in her capacity as Investment Manager, Uniseed. Natasha has since taken on the role of Chief Operating Officer at Quasar Satellite Technologies.

Ben Wright Managing Director of Ballistic Ventures

Ben currently works at Ballistic Ventures, a medtech venture studio building the next generation of clinician-led innovations.

He has over 20 years' deep-tech commercialisation experience within both private and ASX-listed technology businesses, most recently as corporate venture capitalists and the former Director for the NSW Medical Device Commercialisation Training Program, an initiative of NSW Office for Health and Medical Research.



Physical Sciences Fund Announcement Event, Fishburners, Sydney Startup Hub, 15 December 2021 (L to R):
Henry Gong, CEO, Roobuck; Dr Gerry Swiegers, CTO, Hysata; Liam Hescock, Head of Product, Growwave; the Hon. Gabrielle Upton MP; Karl Watfern, co-founder, Hullbot; Professor Hugh Durrant-Whyte; David Finlay, CEO, Sensortine; Dr Abbie Widin, co-founder, Defy-Hi; Alexander Soeriyadi, CEO, LLEAF.

