Physical Sciences Fund 2024

The Collider

Tuesday 26 November 2024

NSW GOVERNMENT

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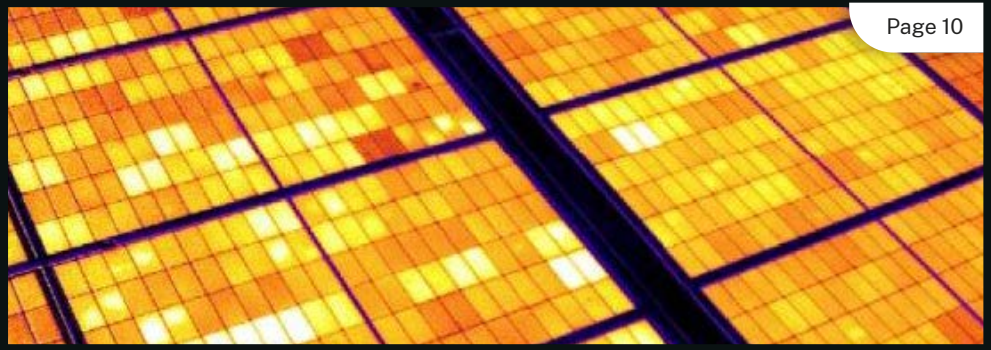
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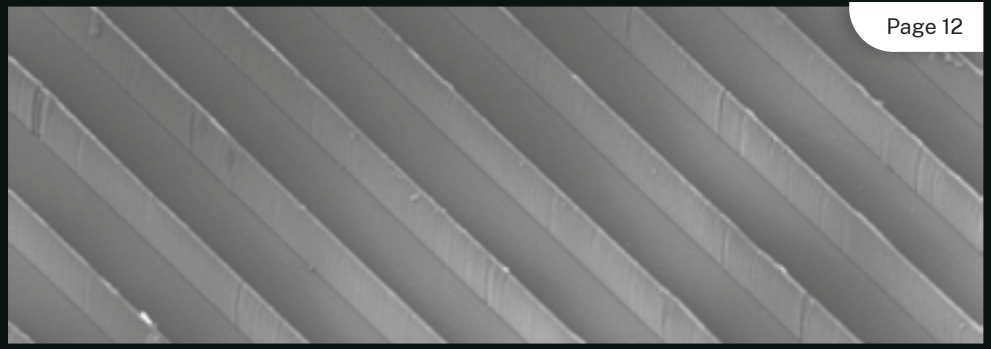
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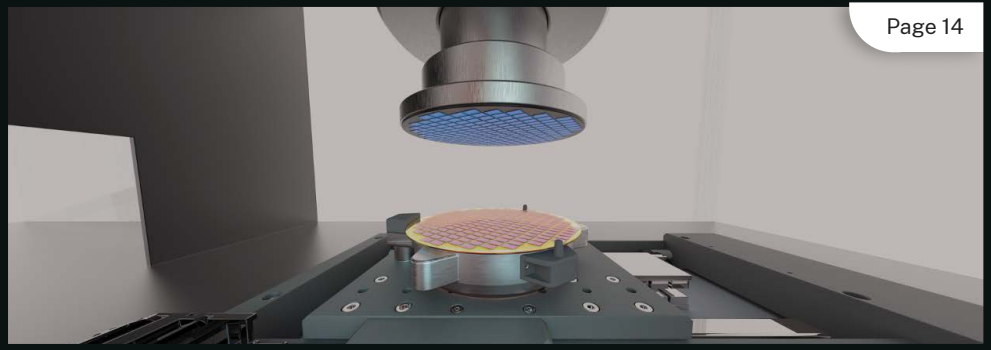
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Physical Sciences Fund 2024

Announcement Event

Order of Proceedings

Introduction and Acknowledgement of Country

Master of Ceremonies
Hebbat Manhy
Group Executive Technology & Commercialisation, Cicada Innovations

Address from the NSW Chief Scientist & Engineer

Professor Hugh Durrant-Whyte

Video address from the Minister for Innovation, Science and Technology

The Hon Anoulack Chanthivong MP

Physical Sciences Fund 2024 Video

Announcement of the Physical Sciences Fund 2024 Recipients

Emeritus Professor Annabelle Duncan FTSE FRSN
Chair, Physical Sciences Fund Expert Panel

Professor Hugh Durrant-Whyte

Discussion with Recipient Panel

Hebbat Manhy

Message from the NSW Chief Scientist & Engineer

Today, we gather to celebrate the fifth birthday of the Physical Sciences Fund and to acknowledge the exciting, impactful technology being developed by the four successful companies.

We actually held a much bigger party earlier this year to celebrate the many innovative NSW startups supported through programs run by my office, an event that couldn't have happened without the enduring, incredible success of the PSF, which to date has provided $19 million to 18 companies, resulting in the attraction of more than $300 million in additional investment.

The Research Commercialisation Showcase was attended by 400 people, and was a day spent looking at how government, industry and research could improve collaboration to further accelerate the development and commercialisation of innovative ideas in NSW.

Over 30 companies attended, displayed and presented, each previously supported through programs including the Small Business Innovation & Research Program, the Bushfire Commercialisation Fund, the Bushfire Technology Pilots Program and the Quantum Computing Commercialisation Fund.

Fittingly, the day culminated in the announcement of the successful recipients of our newest initiative – and the PSF's sibling program – the BioSciences Fund.

All of these programs stand out, but the Physical Sciences Fund is my office's longest running, most successful program and has proven to be the launching pad for some genuine startup success stories.

Wagga Wagga-based connectivity company Zetifi has gone on to raise $12 million in Series A funding led by Telstra and Graincorp to roll out its Wi-Fi extension products to Australian farmers. In May this year, Wollongong-based green hydrogen company Hysata raised $172 million in a Series B, a record for Australian clean tech.

This year's successful recipients are developing innovative solutions for industrial hazard reduction, solar panel fault detection, improved semiconductor fabrication and increased aeronautical efficiency. I congratulate you all on your vision and hard work and look forward to following your further successes to come.

Professor Hugh Durrant-Whyte

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

It's incredible to note that the Physical Sciences Fund (PSF) is now in its fifth year. It's been my great privilege to chair the Expert Panel since its inception, sitting alongside some of NSW's best scientific and entrepreneurial minds.

Assessing the PSF has given us a front-row seat to witness the amazing depth and breadth of innovative startups in NSW. This year's successful recipients are as varied and impressive as those in the previous four years.

Among this year's successful recipients, we see the return of an exciting company previously supported by the PSF in 2020 to develop its unique film, which when applied to aircraft, reduces friction drag, with impressive gains in fuel efficiency and emissions. This year's funding will allow the company to gain certification, paving the way for global impact through access to the US aviation market.

Other impressive technologies being celebrated tonight are a novel system combining radio sensing and AI for swift fire prediction and detection, a drone-based photoluminescence imaging system to detect faults in solar panels during daytime and a company building the next generation of semiconductor chip manufacturing tools.

We welcome our Expert Panel's newest member, Professor Salah Sukkarieh, a world leader in robotics and intelligent systems, who brings significant previous experience in overseeing the development of robotic systems for sustainable agriculture. We bid a fond farewell to Professor Tony Weiss AM, who now chairs the Expert Panel on the PSF's twin program, the new BioSciences Fund. Thank you as always to existing Expert Panel members Martin Duursma, Professor Renata Egan and Dr Simon Poole AO. And finally, my thanks to the Physical Sciences Fund Sub-Committee, who helped us to assess applications and refine our review – work which 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.

Emeritus Professor Annabelle Duncan FTSE FRSN

ENVISION SYSTEMS

AI-Driven Fire Prediction and Detection System

“Envision sensors are the first to combine radio sensing and AI to quickly predict and detect fires and other hazards. They can reliably and accurately pinpoint the location of a hazard within seconds.”

Aruna Seneviratne, CEO

Cargo fires happen on ships more than once a week, posing serious risks to vessels, cargo, crew and the environment. Current smoke detectors on cargo ships are slow and don't pinpoint fire locations, which limits response effectiveness. Shipping companies are now looking for better technology to protect their assets.

Envision’s technology uses AI and radio sensing to provide real-time monitoring and hazard detection by analysing changes in Wi-Fi and radio signals. This system can detect fires, moving objects and hazardous gases, and it pinpoints their exact locations for quicker responses.

Beyond shipping, Envision's technology is also valuable in mines, tunnels and storage yards, and it can be customised to monitor factors like humidity, gas levels and loud sounds. It has already been tested successfully in the Sydney Harbour Tunnel, on cargo ships and in a logistics shipping yard, proving its effectiveness in real settings. More trials are underway in a Sydney logistics terminal, showing its readiness for commercial use.

PSF funding will help Envision achieve Lloyds Registry certification — a critical milestone for regulatory compliance and industry adoption — finalise product development and expand its market presence through targeted marketing and sales.

Envision-Sys Pty Ltd

envision-sys.com

Stage/Category:

TRL 6 - Fully functional prototype or representational model

Contact:

Aruna Seneviratne
CEO

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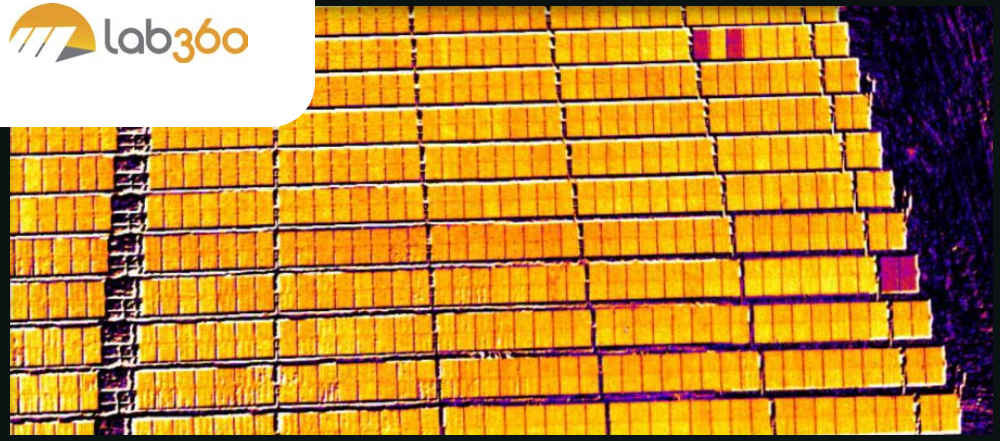

Photoluminescence Imaging from Aerial Drones

“Lab 360 Solar's core technology, drone-based photoluminescence imaging, offers unparalleled insights into quality variations across solar modules in large-scale power plants. As the demand for long-lasting, reliable solar panels grows, our technology will play an important role in the global shift from fossil fuels to renewable energy systems.”

Thorsten Trupke, CEO

By 2030, 87 per cent of NSW’s electricity is expected to come from renewable sources, with solar photovoltaic (PV) technology comprising a key component. PV module performance can be impacted by manufacturing issues, damage during transport and installation, natural degradation and severe weather events. Advanced inspection and monitoring solutions are, therefore, essential to ensure PV module quality, longevity and PV system reliability.

Lab 360 Solar’s core technology, daylight photoluminescence (DPL) imaging is comparable to X-ray imaging in medical applications, in that it enables material and device defects and faults to be detected, that cannot be seen with the naked eye. Until recently, DPL imaging has only been used in laboratories and factories, since outdoor applications on operational solar systems in full daylight are significantly more difficult to achieve. Our innovative technical solutions now enable DPL imaging during the day and from aerial drones, making it a more practical and cost-effective solution in comparison to existing methods. DPL image data can be combined with other inspection data, such as thermal and visual images, and will be analysed automatically using AI-based methods.

Lab 360 Solar have successfully demonstrated DPL imaging on both residential rooftop PV systems and in utility-scale solar farms. Prototype measurement systems produced exceptional results, detecting previously unknown device defects and system faults that can significantly impact module performance and longevity.

PSF funding will help Lab 360 Solar develop a highly customised enterprise drone, an important key element in transitioning the technology from its current technology readiness stage into finely tuned commercial services.

Lab 360 Solar Pty Ltd

lab360solar.com

Stage/Category:

TRL 5 - Process validation in a relevant environment

Contact:

Thorsten Trupke
CEO

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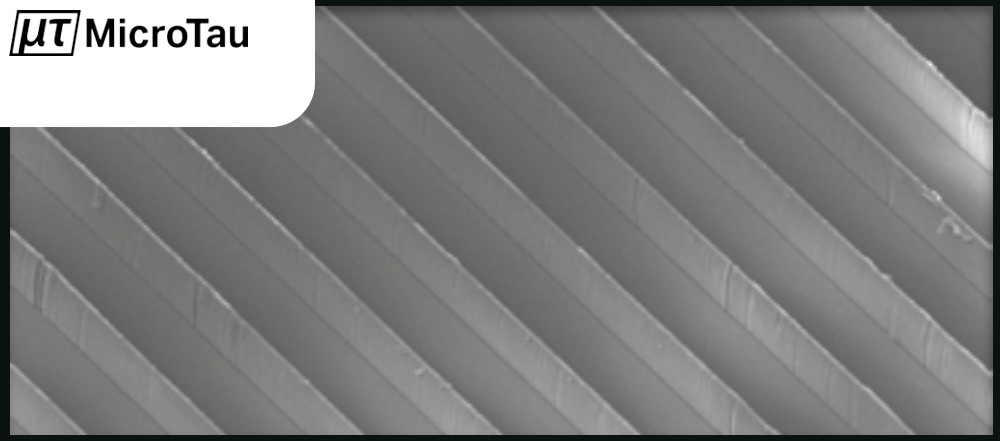
MicroTau



Shark-skin Drag-reducing Aviation Adhesive Film

“Aviation has a burning fuel problem - the global aviation industry spends hundreds of billions on fuel and emits a billion tonnes of CO_2 annually, and this is only set to increase. With clean aviation technologies decades away, our product provides a real path to saving aviation megatonnes of CO_2 billions of dollars in fuel by the end of the decade.”

Henry Bilinsky, CEO

Globally, the commercial aviation sector burns hundreds of billions on fuel and produces one billion tonnes of carbon emissions every year. As governments and industry work towards Net Zero, there is a pressing need for decarbonisation solutions in the aviation sector, one of the only sectors where emissions are continuing to rise.

To help change this trajectory, MicroTau has harnessed the drag-reducing properties of shark skin to create an adhesive riblet film with microscopic patterning that reduces aircraft friction drag. The company’s uniquely designed riblet microstructures create an alternative surface for hairpin vortices to interact with, reducing their contact with the aircraft surface.

MicroTau’s proprietary manufacturing method, known as Direct Contactless Microfabrication, allows riblet design to be easily and cost-effectively customised to the specific needs of aircraft and operating environments. Through this, a reduction in fuel costs and carbon emissions of up to four per cent is possible. For companies operating Boeing 737-800 aircraft, this a reduction of 778 tonnes of CO_2 emissions per aircraft each year.

To date, the company has already worked with key aviation players, including Boeing and Lockheed Martin. Funding from the PSF will allow MicroTau to gain certification for its drag modification package for the Boeing 737-800 with the US Federal Aviation Administration, paving the way for global impact through the US market.

MicroTau Pty Ltd

microtau.com.au

Stage/Category:

TRL 6 - Fully functional prototype or representational model

Contact:

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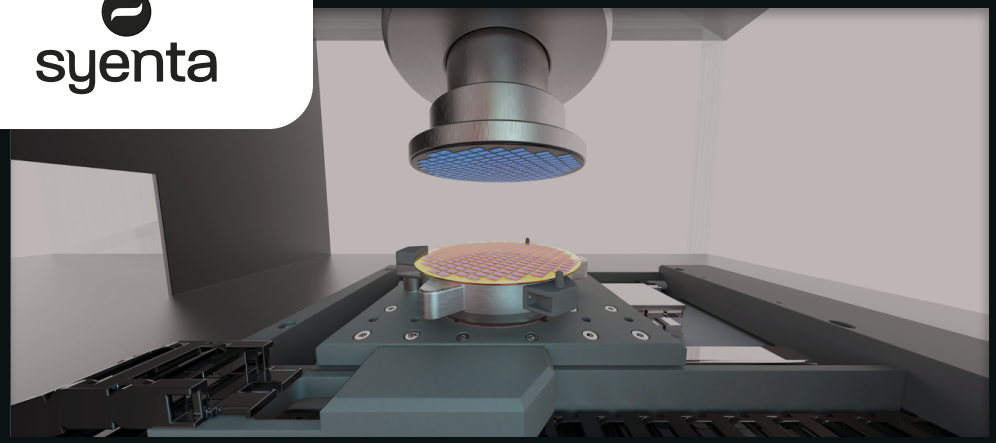

Next-Gen Chip Fabrication: High Speed Additive Manufacturing of Advanced Packaging

“Syenta is building the next generation of semiconductor chip manufacturing tools. With our stamp-based deposition technology, we can fabricate the critical chip components needed for AI and quantum computing faster and cheaper."

Ben Wilkinson, CTO

The semiconductor industry is booming, fuelled by the rapid growth of generative AI applications in high-performance computing systems, AI accelerators and other cutting-edge technologies. However, the industry faces a critical bottleneck in advanced packaging (AP) technology, as traditional methods are complex, time consuming and capital-intensive.

Syenta’s Localised Electrochemical Modelling (LEM) is a significant breakthrough in semiconductor fabrication, consolidating AP manufacturing from a multi-step process into a single additive step, simplifying production and significantly reducing costs. By simplifying previously complex processes, LEM enables more efficient production of the large-area, multilayer interposers needed for high-performance electronic devices.

LEM elegantly merges the strengths of electroplating and imprint lithography. Electroplating, while producing high-quality deposits, lacks the spatial selectivity required for patterning. Imprint lithography on the other hand, excels in patterning but is unable to deposit metals. LEM overcomes these challenges by introducing a localised electric field that selectively directs material deposition onto a conductive substrate, combining deposition and patterning into a single step. This integration dramatically reduces the number of processing steps and the associated equipment needs.

Experimental demonstrations have confirmed LEM's ability to achieve deposition rates, areas and material properties far surpassing the requirements of AP. It is also highly scalable and addresses serious safety concerns in semiconductor manufacturing by eliminating the need for vacuum environments and using low-risk chemicals.

PSF funding will help Syenta demonstrate LEM’s feasibility in a commercially relevant setting and enhance process reliability and repeatability. This will lead to the development of a functional AP device, showcasing LEM’s potential to revolutionise semiconductor manufacturing.

Spark3D Pty Ltd (trading as Syenta)

www.syenta.com

Stage/Category:

TRL 4 – Developed and validated components and subsystems

Contact:

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CTO

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Physical Sciences Fund Expert Panel Chair

The Expert Panel which oversees and assesses 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.

In 2024, Professor Salah Sukkarieh replaced Professor Tony Weiss.

Emeritus Professor Annabelle Duncan FTSE FRSN, 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 Ventures (CSIRO Innovation Fund) and has over 25 years' experience as a technologist, business founder, angel investor and mentor in Australia and the US.

A senior executive at Citrix, where he built their research arm Citrix Labs, Martin started the Citrix Accelerator and led investment in over 30 new companies. As VP and head of the Global Technology Office, he led due diligence in over 60 transactions totalling $2.5 billion.

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 and Cylite), which have generated over $1.25 billion in revenues to date.

Professor Salah Sukkarieh

Salah is a Professor of Robotics and Intelligent Systems at the University of Sydney. A Fellow of IEEE and ATSE, Salah has led impactful R&D projects in logistics, aviation, aerospace, education, environmental monitoring, agriculture and mining.

Salah was CEO of Agerris, an Agtech startup, from 2019-2022, overseeing the development of robotic solutions for sustainable agriculture. Previously, he was Director of Research and Innovation at the Australian Centre for Field Robotics, leading strategic research and industry programs. His numerous accolades include the NSW Science and Engineering Award (2014), Engineers Australia's Most Innovative Engineers (2016), the CSIRO Eureka Prize for Leadership (2017) and being named one of Engineers Australia's Centenary Heroes (2019).

Physical Sciences Fund Sub-Committee

Ben Wright **CEO of Mimetic Pty Ltd, Chair of the Sub-Committee**

Ben currently operates Mimetic, a medtech venture studio building the next generation of clinician-led innovations and is Managing Director of Ballistic Ventures, an IP-centric commercialisation consultancy. 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.

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.

Natalie Chapman **Managing Director, gemaker**

A powerhouse in STEM commercialisation, Natalie has spent over 20 years turning innovative ideas into successful ventures across a broad spectrum of industries. Her expertise spans the critical minerals, recycling and clean energy, nuclear, environmental, medical, IT, space and education sectors. She co-founded and directs gemaker – a team of STEM commercialisation experts helping Australian researchers and innovators to get their research out of the lab and into use. Natalie is an honorary Professor of Practice in Business at the University of Wollongong (UOW) and an industry advisor to UNSW Sydney School of Chemistry and UOW Faculty of Business and Law. She holds a BSc (Hons) in Chemistry from UNSW Sydney and an MBA in Marketing from UOW.

Laura Droessler-Dansie **Investment Manager, Uniseed**

Laura is an experienced technology transfer professional, having worked in university commercialisation and entrepreneurship settings at UNSW Sydney and the University of Oxford in the UK, including overseas development programmes via the UK Newton Fund in collaboration with the Royal Academy of Engineering. Most recently she acted as Senior Business Development and Commercialisation Manager at UNSW Sydney, where she led the Physical Sciences Team developing collaboration and translational activities across the Faculty of Science. Laura holds a PhD in Materials Science from the University of Oxford.

Professor Maryanne Large **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 startups). 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 startup companies, including Regrow and Earth AI.

Dr Leong Mar **The University of Sydney**

Leong is the Head of Commercialisation at the University of Sydney leading research commercialisation. He is an experienced entrepreneur, intrapreneur and innovator with 25 years' experience in the private and research sectors. Previously he was at CSIRO, serving in a number of roles including Commercial Initiatives Director, Commercial Director of the Missions Program and Commercialisation Manager, as well as DuPont Australia as Technical Centre Manager, Corporate Business Growth and Innovation Leader. Leong has been on Uniseed's Investment Committee since 2018 representing CSIRO and the University. He has been involved in numerous startups as founder, executive, mentor, advisor and board member.

Associate Professor (Hon) Alexandra Meldrum
Chair, International Scientific Board, Net Zero Institute

Alexandra is a professional engineer, economist and non-executive director. She brings expertise in strategy, transformation, economics and education, with thirty years' experience in governance and leadership. She led the groundbreaking global project for the Institution of Chemical Engineers 'Engineering a Sustainable World', technical report published 2024. Alexandra teaches MBA students. She held leadership roles in the Productivity Commission at NSW Treasury, Strategic Projects at Department of Industry and the international food, manufacturing and energy industries.

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.

2022 Physical Sciences Fund Event Discussion Panel: (L to R) representatives from The Yield, Hysata, Zetifi and Site-Hive.


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