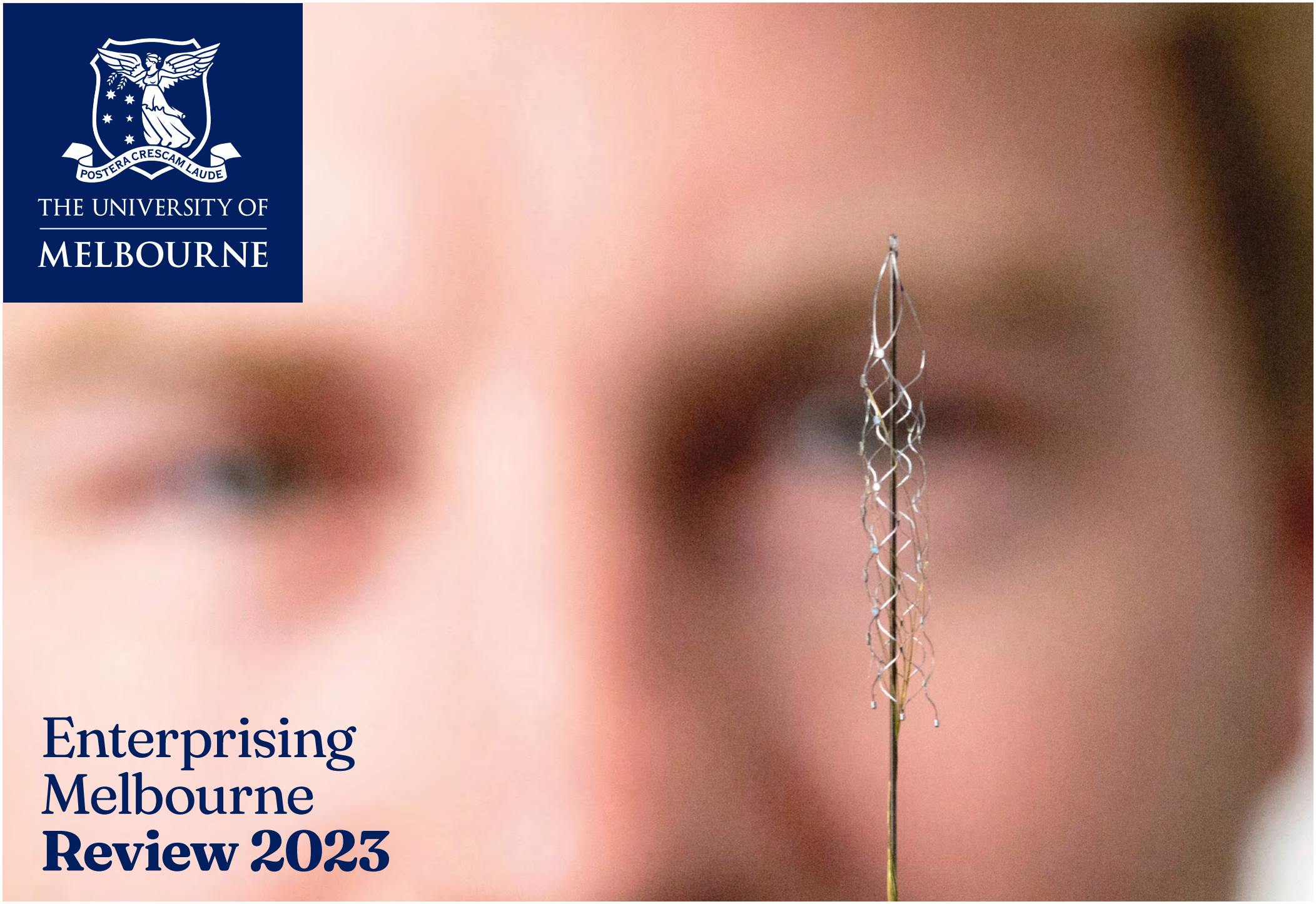
THE UNIVERSITY OF MELBOURNE



# Enterprising Melbourne **Review 2023**

# Contents



Note: All references to $ / dollars are Australian dollars ($AUD)

*Front cover: Synchron co-founder Professor Nick Opie holds the Stentrode, a brain-computer interface that allows patients with paralysis to control external devices using just their thoughts.*

# Acknowledgment of Country

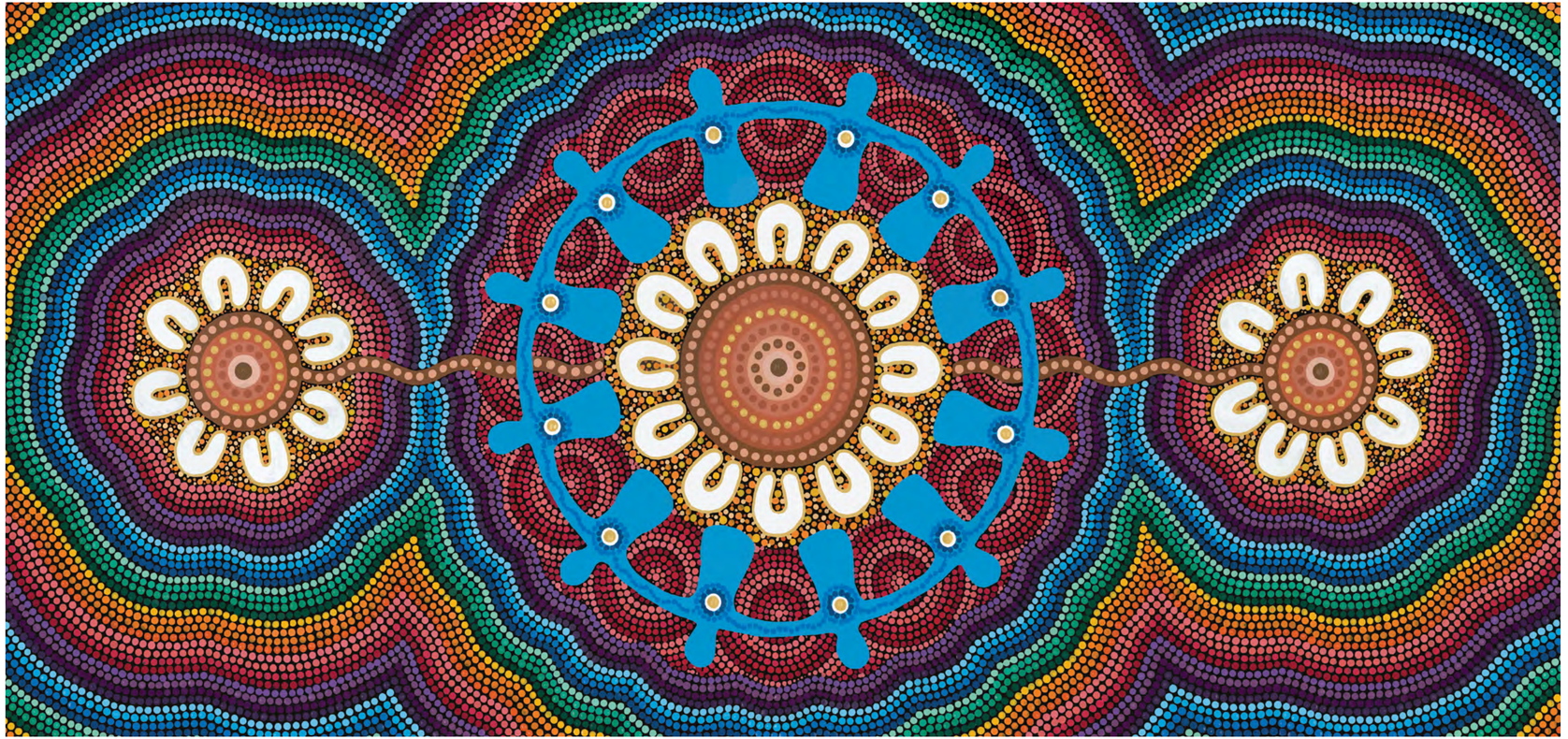
The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff, and students we are privileged to work and learn every day with Indigenous colleagues and partners.

In making this Acknowledgment of Country we commit to respectful and responsible conduct towards all others according to the traditional lores of this land, particularly at times of formal ceremony.



*Artwork 'Guiding our future' by Aaron Eastment*
*Acrylic on Canvas*
*Aboriginal/Torres Strait Islander*
*Wiradjuri & Mabuiag, Erub Islands*

*From the artist: "This work is symbolic of the ripple effect of research discoveries, and how a dynamic ecosystem is needed to help these ideas grow so that they can serve the community. The researchers are seen at the centre of the circles in brown, their ideas in yellow and our community at the university in blue, who, when united with partners, can help these innovations flow into wider society, with the intention of creating a better world."*

# Message from the Vice-Chancellor

Research is integral to the University of Melbourne's purpose. The extensive impact of the University's research can be seen across multiple areas of social and public life, from informing government policy and reforming legal systems, to discovering treatments and vaccines for diseases, supporting new ideas and practices through the arts and fine arts, and of course, through the way it educates thousands of students across numerous disciplines.

One avenue of impact that is pursued at the University of Melbourne is the commercialisation of research. During my tenure as Vice-Chancellor, we have invested significant resources and funding into translating more research via the creation of new products, services, and companies.

Working closely with our affiliated research institutes, government bodies, and industry and precinct partners, the University is focused on evolving and investing in a vibrant and dynamic innovation ecosystem that supports the nurturing of new ideas and technologies.

As this inaugural *Enterprising Melbourne Review* shows, creative solutions to numerous complex problems in the world are emerging from these efforts.

In 2022 we launched our two new venture funds, the Genesis Pre-Seed Fund in partnership with Breakthrough Victoria, and Tin Alley Ventures, a joint venture with Tanarra Capital. These funds and their associated international networks are now helping University-affiliated researchers to start scaling up their research and innovative ideas through the creation of new start-up companies.

The *Enterprising Melbourne Review 2023* highlights some of the great progress made over the past year as researchers make the most of increasing support to translate more of their big ideas into practical solutions to complex problems.

I thank all our valued partners for supporting the research work of our University's academics, staff, students and alumni.

**Professor Duncan Maskell**
**Vice-Chancellor**
**The University of Melbourne**

# At a glance

## University of Melbourne

As a place of discovery and enquiry, the University of Melbourne's purpose is to benefit society through the transformative impact of education and research.

Established in 1853, the University of Melbourne is one of Australia's oldest universities and the first in Victoria. With state-of-the-art facilities and a commitment to interdisciplinary collaboration, the University continues to be a driving force in shaping the future through impactful research.

The University is embedded within world-class research and innovation precincts, and actively engages with communities and partners to help address major social, economic, health and environmental challenges.

With a commitment to excellence, the University of Melbourne is among the world's best universities, delivering education and research that are global in reach, ambition and impact.

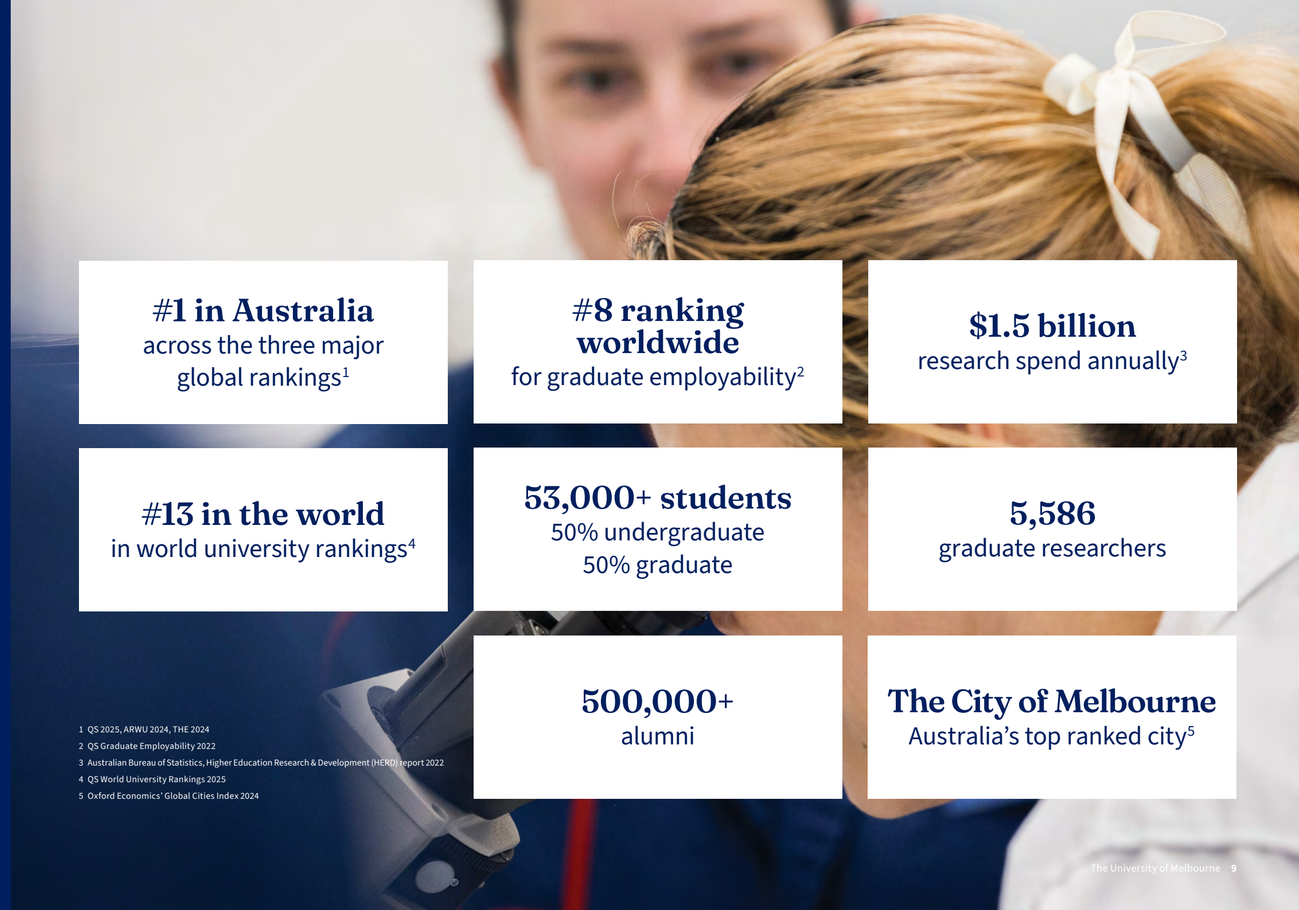
## Research

At the leading edge of discovery, understanding and impact, through research.

The University of Melbourne is a comprehensive research, teaching and learning institution addressing complex problems in innovative ways with investigator-led, interdisciplinary collaborations. Our researchers work together with government, industry, community and specialist research institutes to translate their discoveries. These partnerships enable advancements in sustainability, global resilience and health, as well as supporting economic and social empowerment.

With over 100 research centres and institutes, we bring together expertise from across the University and connect with thought leaders around the world.

The 2030 Advancing Melbourne strategy sets out the University's ambition to strengthen its reputation as a place where students and academics convene to address difficult questions and challenges. Strengthening opportunities for researchers to translate their research is central to the University of Melbourne's purpose to change society for the better.



**#1 in Australia**
across the three major global rankings[1]

**#8 ranking worldwide**
for graduate employability[2]

**$1.5 billion**
research spend annually[3]

**#13 in the world**
in world university rankings[4]

**53,000+ students**
50% undergraduate
50% graduate

**5,586**
graduate researchers

**500,000+**
alumni

**The City of Melbourne**
Australia's top ranked city[5]

1 QS 2025, ARWU 2024, THE 2024
2 QS Graduate Employability 2022
3 Australian Bureau of Statistics, Higher Education Research & Development (HERD) report 2022
4 QS World University Rankings 2025
5 Oxford Economics' Global Cities Index 2024

# Foreword from Managing Director Research, Innovation and Commercialisation


It gives me great pleasure to present the University's inaugural *Enterprising Melbourne Review 2023*. This is a new annual publication, one designed to highlight and celebrate fantastic research translation and impact projects, people and stories emerging from the University's innovation ecosystem.

Bringing cutting-edge research from the lab into the world isn't easy but it is a mission we're committed to and is an integral part of our social licence to operate. We know it takes time, resources and the right mix of people, science and capital to translate a good idea into lasting impact and commercial success. We're striving to deliver on the University's commitment to be a leading global force for entrepreneurship, innovation and commercialisation.

The University of Melbourne has a track record of commercialisation success and I'm very confident we have the potential for a lot more. Globally recognised companies such as Airwallex, Clarity Pharmaceuticals, Cochlear and Synchron, and major industry partnerships with global giants such as CSL and Illumina, are using University of Melbourne research discoveries to address global health crises, technological disruptions and sustainability challenges.

We want to drive more of this innovation through new licencing deals, industry partnerships, new startups and social ventures. The advancement of Australia's economy becomes possible through the creation of new high-tech jobs and additional career options for our researchers, students and staff.

We're striving to make the research translation process quicker and more consistent for everyone, removing bottlenecks between research and government support for commercialisation, investors, customers and global markets.

I'd like to take this opportunity to acknowledge our incredible alumni as well as those in the University and our ecosystem partners who are taking the lead on these ambitious changes – both in academic leadership and professional roles. It's making a difference.

I hope the *Enterprising Melbourne Review 2023* gives you a sense of the scale and breadth of our aspiration and the major transformation under way here at the University – I extend an invitation to you to join us on this important and exciting journey.

**Ken Jefferd**
**Managing Director**
**Research, Innovation and Commercialisation**
**UM Commercialisation Pty Ltd**

*Lorace Zhang, Founder of Vysum – a startup from The University of Melbourne – has developed an eye-health platform that improves eyedrop compliance and medication usage tracking.*

# Building a thriving innovation ecosystem – the story so far

## Precincts

**We know that we need the right spaces to facilitate collaboration with our industry and community partners. That's why we have a growing network of world-class innovation precincts that collectively house 150+ businesses, industry and startup residents including:**

- Melbourne Biomedical Precinct (40+ biomedical organisations)
- Melbourne Connect
- Cremorne Digital Hub
- Melbourne Arts Precinct
- Jumar Bioincubator at CSL
- Aikenhead Centre for Medical Discovery (ACMD), Fishermans Bend and Australian Institute for Infectious Disease (AIID) – *under construction.*

*Melbourne Connect, a purpose-built innovation space in the Melbourne Biomedical Precinct.*

## Expertise

**Business ventures need specialist business knowledge and expertise to succeed. That's why we have in-house commercialisation and startup experts on hand to help more researchers translate their ideas into new products, services and companies including:**

- knowledge and technology transfer
- business development
- venture creation
- investment management
- industry partnerships
- entrepreneurial education
- Founders in Residence
- Enterprise Fellows.

*Genesis Investment team and Venture Creators at the Started@Melbourne Showcase 2023.*

## Programs

**We're supporting research translation by growing the entrepreneurial skills and knowledge of our staff, students, founders and academics. We do this through the delivery of world-class programs such as:**

- Translating Research at Melbourne (TRAM)
- Melbourne Accelerator Program (MAP)
- PhD Innovators Program
- Venture Studio
- InnovateEd
- Innovation by Design
- Ignite Opportunity Lab (O-Lab)
- Hospital Innovation Acceleration Program
- VC Catalyst Program (Wade Institute of Entrepreneurship/LaunchVic)
- Master of Entrepreneurship (Wade Institute of Entrepreneurship)
- MBA Innovation Bootcamp (Melbourne Business School).

*Participants at a workshop run by the Melbourne Entrepreneurial Centre.*

## Community

**We know that partnering with others is essential if we want to make an impact in our local and global communities. That's why we engage and attract some of the brightest talent to cultivate our ecosystem including:**

- alumni - entrepreneurs, venture capitalists, business and industry specialists and commercialisation experts
- staff, students and graduate researchers
- industry partners including global corporations, small and medium enterprises and startups
- research institutes and hospital partners
- government partners
- University and ecosystem partners.


*Climasens Co-Founder and CEO Joseph Glesta, presenting at MAP Demo Day.*

## Funding

**We know that early-stage ideas need appropriate and timely funding to succeed. We work with investment, industry and government partners to provide these funds and supporting schemes including:**

- Proof of Concept Scheme
- $15m University of Melbourne Genesis Pre-Seed Fund® (established with Breakthrough Victoria)
- $125m Tin Alley Ventures Fund (a joint venture with Tanarra Capital)
- Biocurate (with Monash University and Victorian Government)
- Uniseed
- Investment partners
- Commercialisation grants.

*Kali Healthcare founder, Associate Professor Fiona Brownfoot, demonstrating Kali's pregnancy monitoring device with a patient.*

## Vision and Culture

**Culture is critical. It underpins everything. We're creating a University culture that recognises and rewards innovation and enterprise as a valued avenue for academics, students and alumni. To foster this vision, we have:**

- introduced a refreshed academic development and promotion framework recognising commercialisation and entrepreneurial activity as a measure of success
- created senior enterprise and innovation academic leadership roles across different faculties
- standardised our licencing processes to ensure consistency
- activated UM Commercialisation Pty Ltd as the commercialisation company for the University.

*Tin Alley Ventures Managing Partner, Dr Andrew McLean and Investment Committee member, Shilpi Sharma.*


*Melbourne Entrepreneurial Centre (MEC) program managers Katrina Gaskin (Velocity), Dr Nicki Cranna (InnovatEd), and Giulia Gizzi (TRAM) hosting the 2024 Ignite: Future Founders Festival. The pilot event celebrated early-stage innovators and showcased the impactful pathways available through MEC initiatives.*

# **Spotlight on** the ecosystem

# Spotlight on:
# **Melbourne Connect**

The Melbourne Connect precinct in Parkville is a dynamic innovation hub at the University of Melbourne where students, academics and companies converge to solve some of the world's most pressing challenges.

This unique University setting allows Melbourne Connect to bridge the gap between academic research and real-world applications, creating marketable solutions in areas such as food security, climate change and healthcare. By fostering collaboration, the precinct not only addresses global issues but also generates jobs and drives economic growth.

Opened in April 2021, Melbourne Connect is home to the Melbourne Entrepreneurial Centre (MEC); the University of Melbourne's Faculty of Engineering and Information Technology; the University of Melbourne Genesis Pre-Seed Fund and Tin Alley Ventures; along with a diverse range of companies from early-stage startups and spinouts to publicly listed entities.

## What we offer

### Telstra Creator Space

Telstra Creator Space is a fabrication lab located at Melbourne Connect in the University of Melbourne's innovation precinct. Operated by the Faculty of Engineering and Information Technology, the lab is a space where technology and creativity unite in pursuit of innovative solutions.

### Melbourne Connect Co-working

Located over two levels, Melbourne Connect Co-Working offers a selection of flexible private suites, dedicated desks, meeting rooms, project spaces, media studios and event spaces. It provides a creative home for a curated community of University ventures, startups, scaleups and individuals looking to be immersed in an innovation ecosystem.

### Melbourne Entrepreneurial Centre

Melbourne Entrepreneurial Centre (MEC) is a platform for discovering entrepreneurship opportunities at the University of Melbourne. MEC offers students, staff, alumni, industry and the public opportunities to bring new business ideas to life and develop the skills and capabilities that will give those new ideas the best chance of success.

### Innovative activations and events

The Melbourne Connect precinct hosts an annual program featuring over 300 activations and events including the flagship *Melbourne Connect Innovation Week* — a 40-event festival celebrating the people and projects driving the innovation ecosystem. The precinct also curates the *Future of* series, a quarterly research showcase that unites experts from government, industry and academia to discuss future trends. Additionally, Melbourne Connect hosts pitch nights, hackathons, workshops and panel discussions.

## Highlights

**80,000+**
visitors annually

**55 businesses and startups**
housed in Melbourne Connect Co-Working office space

**20+ international delegation visits**
including the Ambassador of the United States of America, the Chinese Minister for Education, and the Japanese Minister of Economy, Trade and Industry

**300+ precinct events in 2023**
a 40% increase from 2022

*"At the heart of Melbourne Connect is the provision of a space, environment and culture dedicated to interdisciplinary collaboration, where researchers and industry participants cross traditional disciplines to creatively and ingeniously tackle complex problems together."*

**Professor Eduard Hovy**
Executive Director, Melbourne Connect

*The Faculty of Engineering and Information and Technology's Welcome to 700 celebration event in 2022 at Melbourne Connect's ground floor oculus, Women-djerring (meaning to "come together").*

# Spotlight on:
# Melbourne Entrepreneurial Centre (MEC)

Melbourne Entrepreneurial Centre (MEC) is your gateway to exploring entrepreneurship at the University of Melbourne. Established in 2018, and based at Melbourne Connect, MEC empowers students, staff, alumni, industry professionals and the public to turn innovative ideas into successful ventures.

Having supported over 2,000 founders and researchers, MEC provides tailored programs, pitch events, hackathons, masterclasses and workshops. Our key initiatives include the Melbourne Accelerator Program (MAP), Translating Research at Melbourne (TRAM), and InnovatEd. MEC has also launched the PhD Innovators Program within TRAM.

Whether through transformative programs, strategic partnerships or public engagement, MEC is committed to fostering the University's entrepreneurial culture, cultivating future leaders, and turning great ideas into real-world impact.

## Our entrepreneurial pathways

### Translating Research at Melbourne (TRAM)

Established in 2016, Translating Research at Melbourne is Australia's premier university-based research impact accelerator. TRAM runs a comprehensive suite of programs that equip researchers with the skills and mindset to transform their research and innovations into products and services that have real-world impact. TRAM's expansive network of alumni, mentors and staff helps participants to understand their target market, explore commercial viability and leverage opportunities to successfully bring their ideas to market.

### PhD Innovators Program

The PhD Innovators Program was piloted in 2023. The program trains graduate researchers in entrepreneurial skills and mindsets as they pursue their PhDs, enhancing their ability to translate academic research into impactful outcomes.

### Melbourne Accelerator Program (MAP)

Since its inception in 2012, MAP has supported founders through every stage of their startup journey, offering a robust environment where they can thrive. Currently, MAP features a five-month intensive accelerator program, a part-time pre-accelerator program, and a variety of accountability and mentoring groups. By connecting founders with industry leaders, dedicated staff, Entrepreneurs in Residence, mentors and alumni, MAP cultivates a vibrant community that fosters collaboration, innovation and growth.

### InnovatEd

Founded in 2019 and integrated into MEC in late 2023, InnovatEd is an incubation program for educational technology (EdTech) innovations in higher education, focusing on solutions designed for universities as potential first customers.

## Highlights

**Over $441 million raised**
by current and alumni teams since 2012

**2,000+ people trained in entrepreneurship**
across MEC associated programs since 2012

**481 MAP founders, 285 startup teams and $400 million venture capital investment**
since MAP's inception in 2012 as Australia's first university accelerator

**151 TRAM teams and 1,200+ participants since TRAM was established in 2016**

**244 InnovatEd participants**
and 25 teams since 2019

*"At MEC, we want people to feel that they can be part of the entrepreneurial ecosystem. We adhere to the mantra of 'you can't be what you can't see'. People need to see themselves in our programs as well as meet the type of people they aspire to become."*

**Professor Colin McLeod**
Executive Director,
Melbourne Entrepreneurial Centre

*Nehal Jain, Co-Founder of textile recycling startup After, presents to a sold-out crowd at MAP Launch. After is pioneering a circular economy by recovering, recycling and recirculating unwearable textiles back into the industry.*

GENESIS The University of Melbourne Pre-Seed Fund

powered by Breakthrough Victoria | The University of Melbourne

# Spotlight on:
# University of Melbourne Genesis Pre-Seed Fund

The University of Melbourne Genesis Pre-Seed Fund provides staff, student and alumni founders from the University of Melbourne ecosystem with pre-seed investment and specialist support to build deep tech businesses and social ventures that can change the world.

Announced in 2022, the $15 million fund was created by the University in partnership with Breakthrough Victoria, an independent company managing the Victorian Government's Breakthrough Victoria Fund.

The University of Melbourne Genesis Pre-Seed Fund became operational in mid 2023 and is now playing a critical role supporting University of Melbourne affiliated researchers to accelerate the translation of their research through the creation of startup companies.

## What we offer

### University of Melbourne Genesis Pre-Seed Fund

Up to $500,000 investment to help University of Melbourne affiliated researchers, students, staff and alumni to start and grow startups.

### University of Melbourne Genesis Pre-Seed Fund investment team expertise and networks

Support from startup specialists, with deep experience and strong professional networks in research, venture and entrepreneurship, helps portfolio startups secure next round funding.

### University of Melbourne Genesis Pre-Seed Fund office space

Provide co-location options for invested startups in the Fund's main office in Melbourne Connect.

## With support from

### University of Melbourne Venture Creator team

A team of current and former startup founders and entrepreneurs who share their knowledge, skills and connections to help new startups succeed.

### University of Melbourne Venture Studio

A suite of bespoke startup growth support services for selected startups, complementing the Melbourne Entrepreneurial Centre program offerings.

### University of Melbourne global community

Startup mentoring, connections and expertise from the University of Melbourne's global network of alumni, industry, investors, universities and specialist consultants is available for portfolio startups.

## Portfolio companies

CellBauhaus · The Leaf Protein Co. · PSYCHAE THERAPEUTICS · RemagineLabs · FlowAI

## Highlights

**$15m University of Melbourne Genesis Pre-Seed Fund operational**
1 July 2023

**$2.2m invested into 5 startups**

**Additional $2m investment approved by investment committee**

**Investment into startups from 5 sectors**
software, therapeutics, agtech, manufacturing and medical devices

**2,000+ hours venture development**

**4 University of Melbourne interns employed**
through the Students@Work Program

**4 startup teams share the Fund's office space**

*"Trying to build a business, when you've only got yourself and not a lot of resources, is a challenge for new founders. Through the Genesis Pre-Seed Fund, we're providing that important first cheque and expert startup support to help more great founders, academics, clinicians, students and alumni turn their research or invention into new startup companies."*

**Hun Gan, CEO**
University of Melbourne Genesis Pre-Seed Fund

*Leaf Protein Co. Co-Founder and CEO, Fern Ho. The Leaf Protein Co. tackles global food security challenges by using sustainable extraction technology to produce nutritious plant proteins and ingredients from the world's most abundant and sustainable source of protein: green leaves.*

TIN ALLEY
VENTURES

# Spotlight on:
# Tin Alley Ventures

Tin Alley Ventures (TAV) is a pioneering joint venture capital fund initiative between the University of Melbourne and Tanarra Capital. It invests in and commercialises high-potential intellectual property and innovation emerging from the University's academics, students, affiliated organisations and alumni communities. TAV's $125 million Fund 1 is the largest of its kind in Australia, targeting 20–30 investments, with first cheque sizes up to $5 million.

## What we offer

### University-affiliated startup investment

Tin Alley Ventures invests initial cheques up to $5 million from seed to pre-Initial Public Offering (IPO) stage via the following investment process:

- **Opportunity sourcing**
  TAV investment team meets face-to-face with University founders to discuss their work.
- **Assessment and work-up support**
  TAV works up selected research opportunities and ideas by connecting with global academics, industry experts and potential venture capital partners. This helps to develop an understanding of what talent, strategy and funding are needed to advance new opportunities and ideas to value inflection.
- **Deal execution**
  Once an opportunity is validated, the TAV investment team - often in a syndicate with other venture capital investors - constructs and negotiates a financing package that works for both the startup and the investors.

### Founder in Residence (FiR) program

Founders in Residence (FIRs) are individuals with a combined scientific and industry background who possess strong problem-solving and business acumen, scientific literacy, curiosity and humility. Over the course of this ~12 month program, each FiR supports several investment opportunities before committing full time to lead a spinout company. The program provides FiRs with day-to-day coaching, access to a global community of mentors and experts, and hands-on investment advisory experience to broaden their entrepreneurial toolkit.

## Portfolio companies

POROUSLANE · exteRNA · PSYCHAE THERAPEUTICS · apromore · ProximaBio · CellBauhaus

## Highlights

**$125m raised for TAV Fund 1**
largest university-focused fund in Australia

**First investment of $4 million made**
into Psychae Therapeutics in December 2023

**$17.5m committed to 7 startups**

**$20m+ approved by investment committee**
from a pool of ~200 opportunities

**20+ researchers and scientific founders provided with business development coaching**

**200+ University of Melbourne researchers and students engaged**
across 12 educational and connectivity opportunities

**100+ global experts**
and investors engaged

**3 Founders in Residence**
onboarded for up to 12 months

*"Melbourne is unequivocally one of the most productive scientific hotspots in the world. That's why Tin Alley Ventures was set up, as a single university-dedicated endeavour to be that bridge between quality science and the kind of impact we want to see in the world."*

**Dr Andrew McLean**
Managing Partner, Tin Alley Ventures

*Using mathematical modelling and computation, Cell Bauhaus can understand, predict and alter cellular behaviour to harness the power of living organisms. Cell Bauhaus has received investment from Tin Alley Ventures to kick start the company.*


*Dr Daniel Perkins and Associate Professor Jerome Sarris of Psychae Therapeutics and Associate Professor Fiona Brownfoot of Kali Healthcare at the 2023 Started@Melbourne Showcase, hosted by the University of Melbourne Genesis Pre-Seed Fund in partnership with Breakthrough Victoria. The event showcased the founders from the University's first pre-seed startup cohort and celebrated their journeys so far.*

# **2023 highlights** and numbers

# 2023 highlights

**Tin Alley Ventures appoints new CEO Dr Andrew McLean**

10 January

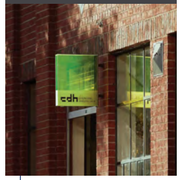
**Acusensus, a Melbourne Accelerator Program startup, closes $20m IPO**

12 January

acusensus

**Cremorne Digital Hub activates its headquarters, appoints new CEO Peter Osborne and launches first Scaleup Program.**

28 March




**The Advanced Genomics Collaboration Innovation Fund opens**

8 May

The Advanced Genomics Collaboration
THE BUILDING BLOCKS OF BETTER HEALTH

**2300+ registered for Melbourne Connect Innovation Week 2023**

4–8 September


**PhD Innovators Program goes live**

6 October

**University of Melbourne and Genesis Pre-Seed Fund announce combined $3m investment into seven startups**

8 November

**Tin Alley Ventures Fund 1 closes at $125m**

10 December

TIN ALLEY VENTURES

**The Faculty of Medicine, Dentistry and Health Sciences' $1m Innovation Fund goes live, supporting grant and immersion programs**

1 January

**More Good Days, a Melbourne Accelerator Program startup, raises $3.5m**

12 March

**Cadmus, a Melbourne Accelerator Program startup, raises $2m**

8 May

cadmus

**$15m University of Melbourne Genesis Pre-Seed Fund is operational**

1 July

GENESIS The University of Melbourne Pre-Seed Fund
powered by
BIOMELBOURNE NETWORK THE UNIVERSITY OF MELBOURNE

**Climasens, a Melbourne Accelerator Program startup, along with partner Urban System Labs, wins a global USD$5 million grant from Google.org**

15 September

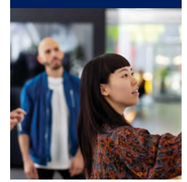
ClimaSens

**The first Started@Melbourne Showcase event takes place**

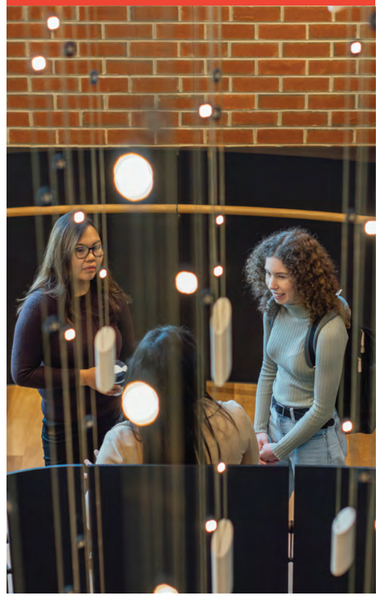
8 November

**University of Melbourne's Social Ventures Exchange goes live**

17 November



# 2023 numbers



## Activating the ecosystem

### Boosting ecosystem activity to accelerate research translation

**Melbourne Entrepreneurial Centre (MEC) program participants***

- 2023: 589
- Since 2019: 1991

**Melbourne Entrepreneurial Centre (MEC) startups and research projects supported**

- 2023: 101
- Since 2019: 404

**Research contracts with external partners**

- 2023: 707

**Proof of Concept Scheme**

- 2023: 31 grants awarded; $58k median grant

**Total participation in MEC programs and associated formal workshops*

## Growing research impact

### Accelerating growth of licences, industry partnerships and new ventures in the community

**Invention disclosures**

- 2023: 145 received
- Since 2019: 623 received

**Patent applications**

- 2023: 41 filed; 279 active
- Since 2019: 183 filed

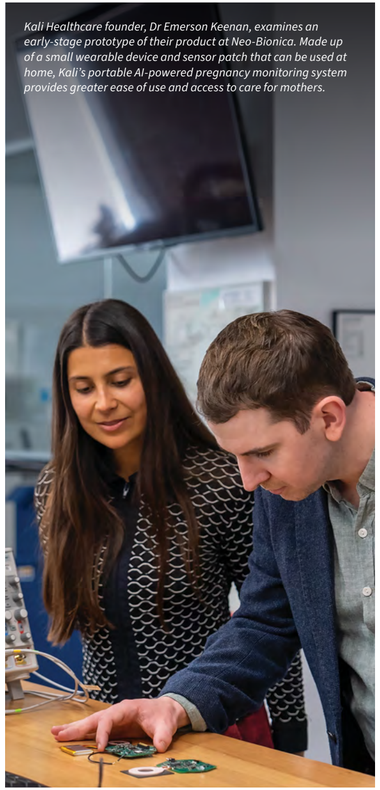
**Licences, options or assignments**

- 2023: 37 executed; 235 active
  - 32 existing companies
  - 5 new startups

**Venture investment performance - UMC* portfolio**

- 2023: 31 companies; $67m investment raised
- Since 2019: $775m investment raised

** UM Commercialisation Pty Ltd*



*Kali Healthcare founder, Dr Emerson Keenan, examines an early-stage prototype of their product at Neo-Bionica. Made up of a small wearable device and sensor patch that can be used at home, Kali's portable AI-powered pregnancy monitoring system provides greater ease of use and access to care for mothers.*

*Co-Founder of Dark Patterns Lab, Swetha Meenal Ananthapadmanaban, presents at MAP Launch. Dark Patterns Lab leverages AI to perform dark pattern audits for consumer-facing businesses 1000 times faster than manual audits. Using the tool, businesses can ensure that their website and product or service offerings are compliant with the privacy and consumer laws of every country they operate in.*

# **Perspectives** on

Perspectives on:
# Growing ecosystem communities

## From the University of Melbourne...

**Dynamic ecosystems create a unique environment where scientific breakthroughs, capital, and commercial talent converge to bring research-led innovations and ideas to life. These vibrant networks bring together diverse groups of internal and external stakeholders including researchers, entrepreneurs, alumni, investors, industry and sector experts. This fosters an environment where new ideas are supported to rapidly evolve from concept to market-ready products or services.**

At the heart of these ecosystems lies a critical mass of commercial talent – individuals with the business acumen, market insights, and operational expertise to translate scientific discoveries into viable enterprises. This human capital, combined with the flow of financial resources and cutting-edge research, forms the bedrock of successful innovation.

Executive Director of the University's Melbourne Entrepreneurial Centre, Professor Colin McLeod, explains what we can learn from the legacy of international university juggernauts in this space.

"Institutions like Stanford, Cambridge and MIT have shown that universities can have a major role in turning research into impact – what is now referred to as the 'Third Mission' of universities, following on from traditional teaching and research activities. These universities are now at the centre of entrepreneurial ecosystems that create jobs, drive economic growth, deliver social benefits and attract investment that underpins future growth."

Community building and engagement is a core focus for the University of Melbourne with particular emphasis on drawing global alumni back to their roots at the University.

"Many of Melbourne's alumni have very rich entrepreneurial experience in Australia and overseas, so they're an invaluable source of wisdom and expertise. The journey from discovery to commercialisation is not linear and to get advice and support from someone who has already been on that journey can be extremely valuable," says Professor McLeod.

"We've also found that many of our alumni have a network of people that has been important to their entrepreneurial journey and it would be hard to overstate the value to an inexperienced entrepreneur of becoming part of that network."

A prime example of this activity is the recent appointment of Andrew Nash as Operating Partner, UM Commercialisation Pty Ltd and Entrepreneur-at-Large. For the last 30 years Andrew was based in the United States before moving back to Melbourne earlier this year to take on the new role. As a proud University alum and experienced serial entrepreneur, Andrew is passionate about connecting more alumni from around the world with the University's global innovation and commercialisation agenda.

"One the most powerful resources our University has available is our local and global alumni network, many of whom have already paved the way as experienced entrepreneurs", says Mr Nash.

"As universities seek to maximise their societal and economic contributions, university ecosystems and the growing pool of motivated alumni joining them are emerging as powerful enablers of innovation, reshaping the landscape of university research and its broader impact."



## From our global community...

### Sohela Shah PhD

**Program Director, Catalyst Program and Invent Fund, University of California San Francisco Innovation Ventures**

**On the vital role of alumni...**

"Traditionally, universities have focused on soliciting financial donations from alumni. However, we can benefit even more from their knowledge and experience. Alumni can mentor faculty and students, helping to develop ventures that yield significant returns in the form of licencing revenue and equity. By engaging alumni to share their real-world insights and help shape the next generation of research, development, technology, products and services emerging from universities, we can create a thriving ecosystem. This ecosystem will support the next generation of innovators and entrepreneurs, fostering a sustainable cycle of growth and innovation."

### Caroline Hyde FRSA

**Head of Ecosystem Initiatives and Partnerships, Cambridge Enterprise, University of Cambridge**

**On the magic ingredients of an ecosystem...**

"Cambridge is a very bottom-up institution which we compare to a rainforest rather than a plantation, and the University's entrepreneurial ecosystem has developed and grown in the same organic way. I think one of the magic ingredients is the porous connectivity to the wider ecosystem in Cambridge – the wealth of easy access to, and supportive engagement of successful serial entrepreneurs, professional services, business networks and other spinouts and startups."

### Anne Dobrée

**Investor Director, Parkwalk Advisors (UK), UM Commercialisation Pty Ltd board member**

**On creating an environment for commercialisation...**

"What universities can do is try to create the right environment and ecosystem for these breakthroughs to thrive commercially when they arise: supporting entrepreneurship and commercialisation as a 'good thing', training and coaching staff and students in commercialisation to improve their knowledge and chance of success, and encouraging and supporting growth of the external ecosystem so that the right funding and expertise – whether services, investors or management – is available to startups. And by providing programmatic networks and other support to help new companies build faster."

### Andrew Nash

**Operating Partner, UM Commercialisation Pty Ltd and Entrepreneur-at-Large**

**On playing to your own strengths...**

"The researcher or innovator will rarely (if ever) have all of the resources readily available. There is nothing more important than a deep ecosystem to support entrepreneurs throughout the journey, at their own pace. There are a number of large ecosystems that have developed globally including Silicon Valley, Boston, Cambridge, Oxford and many others. While the temptation is to copy these ecosystems, we must understand the nuances of our local one and the needs of the village (including industry and technology focus), and then build accordingly."

Perspectives on:
# Solving global challenges

## From the University of Melbourne...

**Universities tackle global challenges through multi-disciplinary collaboration and patient, long-term research. They nurture lifelong learners and foster environments where complex ideas can develop over time into practical solutions. With significant intellectual resources, universities are natural incubators of transformative thinking for the pressing issues facing humanity.**

These institutions often drive advancements in deep tech – a notoriously difficult field requiring sustained effort and expertise. From AI to quantum computing, universities bridge the gap between theoretical breakthroughs and real-world applications, addressing critical areas like climate change and healthcare with cutting-edge research-led innovations.

"Deep tech solutions like artificial intelligence, biotechnology, robotics, quantum computing and nanotechnology often emerge and flourish in an academic setting", explains Professor Peter Choong AO, who will return from sabbatical as Associate Dean of Innovation and Enterprise for the Faculty of Medicine, Dentistry and Health Sciences in 2025.

"Universities are uniquely positioned to tackle complex issues with our research, interdisciplinary collaborations and access to government, philanthropic and now, venture funding. We are institutions filled with problem solvers. We create knowledge and disseminate it. That's our job."

Heather St John is Executive Director, Innovation and Enterprise at the University of Melbourne. "While deep tech inventions provide potential solutions for some of the most intractable problems facing humanity, they also require significant investment, patience and a high tolerance of failure. Industry partners and increasingly, venture capital investors, are important enablers of transformative deep tech solutions emerging from universities worldwide," she explains.

"Lots of researchers are keen to see the new discoveries they make have a direct positive impact on people – to get things 'out of the lab' and into the hands of consumers, patients and broader society. This often needs a trusted industry partner to take that invention forward and develop, scale, manufacture, sell and service it so that it becomes readily available to those who need or want it."

Most recently, the University of Melbourne has taken the lead in harnessing the potential of venture capital with the establishment of the $125m Tin Alley Ventures fund in partnership with Tanarra Capital and the $15m University of Melbourne Genesis Pre-Seed Fund with Breakthrough Victoria. Both venture funds are designed to accelerate the commercialisation of University of Melbourne-affiliated research discoveries and deep tech innovations.

Dr Andrew McLean, Managing Partner of Tin Alley Ventures, believes larger amounts of capital and partners are essential in supporting our best deep tech ideas if Melbourne and Australia are to be successful on a global stage.

"Partnerships that bridge the gap between academia and entrepreneurship are critical. The solutions to our big problems – ageing population, climate crisis and energy crises, and food shortage – wil not be found in new apps or software platforms. They will be revolutionary, not evolutionary. And these deep tech inventions need development and long-term support that only significant capital, increasingly in the form of venture funds, can provide over time."



## From our global community...

### Geoffrey Cumming

**Businessman and Philanthropist, Inaugural donor – Cumming Global Centre for Pandemic Therapeutics**

**On investment in medical research to protect against future pandemics…**

"With COVID-19, we realised how a pandemic can fracture society in addition to causing serious health implications. The global economic costs in terms of the enormous loss of global economic output and revenue, and the devastating and sharp rise in global unemployment, are also deeply threatening facts as well. The 'ice' on which society is standing may be thinner than we had previously thought. Science plays a crucial role in managing health crises, so it's critical that we continue to fund it. It will help to 'thicken the ice' and enhance the resilience of humanity in the inevitable event of the next pandemic."

### Marthe D'Ombrain

**Executive Director & Head, Global Research Innovation, CSL**

**On industry and university partnerships...**

"Partnerships with universities and leading academic scientists are integral to building a sustainable research and development pipeline and delivering on our promise to develop new, life-saving medicines for patients. University research plays a critical role in innovation and the discovery of potential new therapeutic strategies. Through ongoing strategic partnerships, we can tap into the deep biological expertise of academic scientists and couple this with CSL's deep expertise in drug development and commercialisation. This results in a powerful win-win combination with the potential to translate university research into new medicines for patients."

### Professor Robert Langer

**Langer Lab, Massachusetts Institute of Technology (MIT)**

**On deep tech...**

"I think of 'deep tech' as high-risk, long-range research that can be potentially disruptive. And it's not easy to know the winners – right now, it's probably in healthcare, computing or AI – but often it's something that doesn't have a name because it hasn't even been discovered yet. I think university professors are well placed to do this kind of work, which can lead to companies, particularly if patented, that can address these global challenges if they get the right basic research funding – the more research funding, the better."

### Arjun Goyal, M.D.

**Co-founder and Managing Director, Vida Ventures**

**On entrepreneurship and scientific solutions...**

"From my perspective, commercialisation and entrepreneurship are essential to solving big scientific problems. Science for science's sake is an important first step but the ability to transform that science or technology into a medicine means that we can have a real and significant positive impact on human health for patients globally."

*Associate Professor Mahdi Disfani, co-founder of University of Melbourne startup Porous Lane, pouring water through their permeable pavement technology which is made up of up to 60 per cent Australian recycled tyre material as well as locally sourced virgin rock.*

# **Impact** stories

**Licencing**

**Startup**

**Social venture**

**Partnership**

synchron

# Giving people with severe paralysis the power to communicate using their thoughts

| | |
|---|---|
| **Year established:** | 2012 |
| **Sector:** | Therapeutic devices |
| **Faculty:** | Faculty of Engineering and Information Technology and Faculty of Medicine, Dentistry and Health Sciences |
| **People:** | Professor Thomas Oxley, CEO |
| | Professor Nick Opie, Founding Director |
| | Associate Professor Sam John in the University of Melbourne Faculty of Engineering and Information Technology under the guidance of Professor David Grayden and Professor Anthony Burkitt |
| | Professor Clive May at the Florey Institute of Neuroscience and Mental Health |
| | Professor Peter Mitchell and Associate Professor Andrew Morokoff of the Royal Melbourne Hospital |

Imagine if you couldn't communicate? Couldn't even tell the ones closest to you that you love them? For over a decade Melbourne and New York-based company Synchron has been perfecting a stent-like brain implant to give people with severe paralysis the autonomy and means to be understood.

## The need

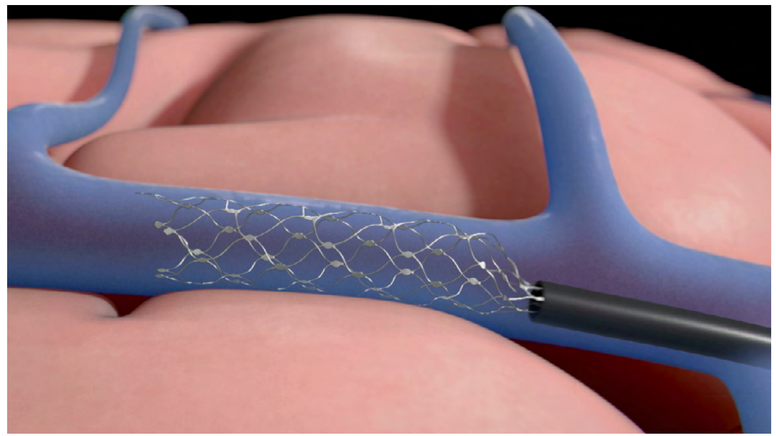
Over 30 million people experience severe paralysis that prevents them from speaking and using their hands or voice to communicate. Other brain computer interface (BCI) technologies existed when University of Melbourne's Professor Thomas Oxley and Professor Nicholas Opie began their work. But these BCI devices were large and needed to be directly implanted via the skull, making procedures highly complex and medically risky.

## The research

Fired with a mission to find an alternative, safe and permanent solution to traditionally complex, invasive brain surgery, in 2012 Professor Oxley and Professor Opie founded clinical stage neurotechnology company Synchron. Its aim was to help people with paralysis regain their ability to communicate and carry out everyday activities by controlling digital devices.

The Synchron team's breakthrough was to develop a stent-like device that would allow patients with functioning brains to control external devices with their thoughts.

The device – called a Stentrode – is inserted into the jugular vein via a small neck incision, manipulated into position in a major blood vessel close to the brain's motor cortex and, once in place, detects and sends neural signals generated by the patient's thoughts. The signals are transmitted to an antenna inserted under the skin in the chest that connects wirelessly to external devices such as computers and smartphones.



*The Stentrode device is inserted into the jugular vein via a small neck incision, manipulated into position in a major blood vessel close to the brain's motor cortex and, once in place, detects and sends neural signals generated by thoughts.*

*"Stentrode's fully implantable, take home, wireless technology has revolutionised human connection for people living with significant paralysis to live more joyful lives."* Professor Tom Oxley

"We have now proven that devices can be left inside a blood vessel and that cells will grow over it, incorporating it into the wall like a tattoo under the skin and protecting the device from an immune reaction in the brain that would otherwise reject it," Professor Oxley said in a recent TED Talk.

"As a result, our team became the first in the world to receive approval from the US Food and Drug Administration (FDA) to conduct clinical trials of a permanently implanted BCI."

## Going to market

The first step in the Stentrode's development was facilitated by a partnership with the University of Melbourne in collaboration with the Royal Melbourne Hospital and Florey Institute of Neuroscience and Mental Health.

"With the initial funding received through the partnership, we set up a laboratory at the University and carried out early-stage research, forming the company at the same time," explains Professor Opie.

"We were in the fortunate position of being surrounded by supportive innovators within the Melbourne Biomedical Precinct who were also trying to figure out new solutions to old problems," says Gil Rind, Synchron's Director of Advanced Tech.

Attracting $217 million funding in its first few years of operation, the Synchron founders were determined to commercialise the Stentrode technology and, in so doing, make it available as widely as possible.

Ongoing and incrementally larger investments enabled the initial US trials to proceed and, ultimately, secure FDA approval to conduct the first study of its kind. Success was consolidated with further high-profile venture investment and backing received in 2022, and from private investment vehicles of billionaires Bill Gates and Jeff Bezos.

## The outcome

Early results from 10 patients showed that patients with a Stentrode implant were able to control a digital device to text and type through direct thought.

"Stentrode's fully implantable, take home, wireless technology has revolutionised human connection for people living with significant paralysis to live more joyful lives," Professor Oxley says.

With ongoing research and continuous improvement, Professor Oxley and Professor Opie are working to apply the Stentrode's applications to other neurological conditions including epilepsy, depression and dementia. In so doing, the scientists have forged a new frontier in medicine for the treatment of neurological diseases called Neurointerventional Electrophysiology.

Professor Oxley and Professor Opie believe their technology holds the promise of autonomy and independence.

"What this really means is giving people dignity", says Professor Oxley.

## Ecosystem support and success

- AU$110 million Series C funding led by ARCH Venture Partners in 2022
- AU$52 million Series B funding round led by Khosla Ventures
- Earlier funding rounds also led by Khosla Ventures
- AU$15 million National Institutes of Health grant in 2021 to launch US trials
- BCI Award for 2021
- Society of Vascular and Interventional Neurology (SVIN) Innovation Award
- TIME's Best Inventions of 2021
- Fast Company's Next Big Things in Tech
- The Australian Top 100 Innovators 2023

**Impact pathways**

**Startup**

**Partnership**

**The Advanced Genomics Collaboration**
THE BUILDING BLOCKS OF BETTER HEALTH

# Fast tracking treatment for genetic diseases

| | |
|---|---|
| **Partnership year established:** | 2019 |
| **Sector:** | Biotech |
| **Faculty:** | Faculty of Medicine, Dentistry and Health Sciences |
| **People:** | Professor and Bertalli Chair in Cancer Medicine Centre for Cancer Research, Sean Grimmond<br><br>Professor Oliver Hofmann, Head of Bioinformatics, University of Melbourne Centre for Cancer Research<br><br>Gretchen Weightman<br>Senior Vice President Asia Pacific Middle East & Africa (AMEA), Illumina<br><br>Simon Giuliano<br>Commercial Lead & Sales Director Oceania, Illumina |

Diagnosing and treating rare cancers and other intractable diseases requires complex and precise scientific analysis. Researchers within the Melbourne Biomedical Precinct are using recent advancements in technology to accelerate genomics-based innovations leading to better patient outcomes and a more efficient and equitable health system.

## The need

In most clinical and hospital settings, patients are treated with standardised, one-size-fits-all care. However, traditional approaches to treatment are not effective for all patients, especially those with the types of cancer that are difficult to both diagnose and treat. Worryingly, two-thirds of cancer patients need multiple rounds of chemotherapies but will not be well enough to undergo ongoing rounds.

"The introduction of new genomic technologies has the potential to completely change the way healthcare is delivered here and across the world", says Professor Sean Grimmond, who heads up the Clinical Genomics Platform of The Advanced Genomics Collaboration – a partnership between the University of Melbourne and global biotech company Illumina, with support from Invest Victoria.

"In the next couple of years, thanks to advancements in this field, the healthcare system is expected to generate genomic data from an estimated 60 million patients globally, contributing to more targeted, individualised care."

Professor Grimmond's hope is to turn cancer into a manageable chronic disease, like asthma or diabetes.

"We don't want people to experience debilitating side effects from treatment that may not work. Taking some of the guesswork out of therapy is the first step towards that goal."


*"In the next couple of years, thanks to advancements in this field, the healthcare system is expected to generate genomic data from an estimated 60 million patients globally, contributing to more targeted, individualised care."* Professor Sean Grimmond

## The partnership

Researchers and biomedical industry experts are working within the Illumina and University of Melbourne partnership to explore genomics-based biomedical innovations. Their aim is to make genomics more affordable and accessible, initially to improve health treatments and outcomes for people with cancer but broadening into a wider range of clinical areas.

The major initiative of the partnership is The Advanced Genomics Collaboration (TAGC). This hub was established with a $60 million investment in 2021 by the University of Melbourne and Illumina with support from the Victorian Government's Invest Victoria and Department of Education and Training.

TAGC has three core infrastructure platforms. The Clinical Genomics Platform will deliver rapid, affordable sequencing of whole genomes on a scale that provides timely insight for every collaborating researcher and clinician. The Bioinformatics Platform is creating, storing and analysing national and global-scale cloud-based genomic datasets. The Health Economics Platform uses this analysis to provide evidence-based guidance for public policy and further investment to embed genomics in healthcare.

These platforms also provide the infrastructure to foster a pipeline of genomics-focused innovation projects led by researchers within the Melbourne Biomedical Precinct.

*Professor Sean Grimmond, Karey Cheong and Voula Dimitriadis using Clinical Genomics Platform's Illumina NovaSeq to sequence patient samples.*

## The progress

To date, TAGC has supported two innovation projects to completion. The Liquid Biopsy Project, based at the University of Melbourne Centre for Cancer Research, has received full diagnostic accreditation through the National Association of Testing Authorities (NATA) to develop simple, non-invasive genomic-based technologies for more effective blood-based diagnosis of challenging-to-treat cancers.

The second is ID Predict, based at the Doherty Institute for Infection and Immunity, for development of a decision-making tool for COVID-19 that predicts disease outcomes in individual patients and informs treatment pathways.

## The outcome

Since establishment of TAGC in 2021, the initiative has supported 11 clinical trials and multiple major studies, including a study into personalised treatment options for patients with cancer of unknown primary origin. To date, 1250 patients with difficult-to-diagnose diseases have been sequenced, including those with cancers that are resistant to standard therapies.

This work has helped leverage over $40 million in funding including $1.9 million for the VCCC Precision Oncology Program to provide a comprehensive toolbox of genomic and molecular tests for clinicians to ensure the right cancer patient receives the right treatment.

In addition, the partnership has created more than 60 new jobs for researchers, scientists, bioinformaticians, genomics assistants and postdoctoral scientists, and supported over 60 student internships and graduate research placements.

## Partnership success

- 11 clinical trials and multiple major studies, including $5 million MRFF funded SUPER-NEXT study
- $40 million in leveraged funding, including $1.9 million for the VCCC Precision Oncology Program
- 60 new jobs, including research fellows, curation scientists, bioinformaticians, genomics assistants and postdoctoral scientists
- 1250 patients, including over 845 sequenced in real-time
- 60 student internships and graduate research placements

**Impact pathway**

**Partnership**

LEFT WRITE HOOK

# Empowering survivors of childhood sexual violence to reclaim their lives

| | |
|---|---|
| **Year established:** | 2020 |
| **Sector:** | Social impact |
| **Faculty:** | Faculty of Fine Arts and Music |
| **People:** | Dr Donna Lyon, Senior Lecturer in Film and TV (Producing) |
| | Shannon Owen, Director of Left Write Hook documentary film |

The horrifyingly high incidence of child sexual abuse and gendered violence has led to a silent and growing public health crisis not only in Australia but across the world. A Melbourne-based survivor-led social venture startup is offering innovative ways to help victim-survivors move beyond the debilitating trauma so many of them face in adulthood.

## The need

The statistics of child sexual abuse and gendered violence are simply staggering, with one in three women and one in five men having lived through these experiences growing up.

For so many, the symptoms that emerge in later life include depression, hypervigilance, shame, guilt, self-blame, low self-esteem, anxiety, complex post-traumatic stress disorder, nightmares, flashbacks and self-destructive relationships. The effects of these debilitating symptoms often result in alcohol and drug abuse.

Victim-survivors are also more at risk of heart disease and lung cancer and have 20 years less life expectancy than the average person. Tragically, many take their lives long before this statistic is realised.

"Despite causing massive social, health and community problems, survivors are typically only offered 'talk therapy'," says Dr Donna Lyon, a senior lecturer in film and television production at the University of Melbourne's Victorian College of the Arts.

"They're rarely given programs that encourage them to engage with their bodies in safe spaces and connect with other survivors, particularly through merging creative arts practices with physical modalities."

*"It's profoundly moving to witness victim-survivors' transformation as they regain self-belief, emotional wellbeing and trust in others."*
Dr Donna Lyon

## The research

Dr Lyon's aim was to develop, test, and document the effectiveness of a community-based recovery program using boxing and creative writing to empower survivors of child sexual abuse and gendered violence to reclaim, rewrite and release their trauma.

In 2020, the Left Write Hook project was formally accepted as a University of Melbourne research program and, since then, has attracted strong academic and industry recognition of the effectiveness of its approach: integrating creative writing techniques with an evidence-based physical program that channels healthy aggression to enable survivors to feel strong and safe, reconnect to their experiences and bodies, and help them move towards post-traumatic growth and healing.

## Going to market

Working with University of Melbourne medical researchers, Left Write Hook successfully demonstrated the economic value of its program in terms of offering health benefits to survivors and, in turn, alleviating the pressure on the social services needed to help them live more positive lives. This evidence-based analysis led to the awarding of funding from the University of Melbourne's Proof of Concept Scheme for the development of a 'train-the-trainer' professional certification program as well as a $600,000 grant from Medical Research Future Fund (MRFF). This crucial funding and support meant that Left Write Hook could be established as a social enterprise, enabling researchers, survivors and charities to determine the program's effects on health and wellbeing and to evaluate how best to deliver Left Write Hook to as many survivors as possible.

Importantly, University of Melbourne seed funding has helped finance the eponymous *Left Write Hook* documentary film that premiered at the Melbourne International Film Festival in August 2024.

"The *Left Write Hook* documentary is crucial to our business model and potential impact as it plays a pivotal role in breaking the taboo on gender-based violence, particularly child sexual abuse," says Dr Lyon. "In documenting the program's success, the film provides a scalable blueprint for other communities, encouraging the replication of our innovative trauma recovery approach."

## The outcome

In a pilot study conducted between 2023 and 2024, researchers surveyed 30 survivors of child sexual abuse to assess their mental health and wellbeing before and after they participated in the eight-week Left Write Hook program.

"Knowing that our innovative approach, backed by research, helps diminish their trauma is incredibly heartening," Dr Lyon says. "It's profoundly moving to witness their transformation as they regain self-belief, emotional wellbeing and trust in others."

*Left Write Hook equips adult survivors of sexual violence to actively take back power through a program blending creative writing and boxing.*

## Ecosystem support and success

Seed funding from Translating Research at Melbourne (TRAM) and guidance through the TRAM Track program, University of Melbourne $123,500 grant funding for film and in-kind sponsorship and Proof of Concept Scheme funding

Research expertise from Melbourne School of Psychological Sciences and Melbourne School of Population and Global Health

$600,000 funding from Medical Research Future Fund (MRFF)

Winner of the Intrepid 'Audience Award' at Melbourne International Film Festival 2024

More than $750,000 investment from Vic Screen and Screen Australia, including tax offsets

Additional screen finance and grant funding from Melbourne International Film Festival Premiere Fund, University of Melbourne, Bonsai Films and Minderoo Pictures.

**Impact pathways**

**Startup**

**Social venture**

CellBauhaus

# Using mathematics and biology to solve tomorrow's problems

| | |
|---|---|
| **Year established:** | 2023 |
| **Sector:** | Software |
| **Faculty:** | Faculty of Science |
| **People:** | Dr Megan Coomer<br>Co-Founder and CEO |
| | Professor Michael Stumpf<br>Co-Founder and CSO<br>Professorial Fellow, University of Melbourne<br>Faculty of Science |

New frontier tech startup Cell Bauhaus is working at the cutting-edge of science. Using mathematical modelling and computation it can understand, predict and alter cellular behaviour to harness the power of living organisms and ensure a safer, more sustainable and prosperous planet.

## The need

While synthetic biology has made remarkable advancements over the past few decades in altering cellular behaviour and leveraging it for our advantage, it is a resource-intensive field. Investigating how genetic changes alter cellular behaviour often requires multiple rounds of trial-and-error testing in expensive laboratories with large teams. This makes innovation challenging.

"Cell Bauhaus has the technology to unblock this bottleneck," says CEO and Co-Founder, Dr Megan Coomer. "Designing biotech and healthcare solutions on the computer vastly reduces development times and costs," she explains. "We see Cell Bauhaus as providing the technology that will unleash new, smarter, engineering-based ways of innovating in the life sciences, biotech, and sciences. It will speed up innovation by orders of magnitude and, in the process, reduce the exorbitant research and development costs associated with these industries."

## The research

Cell Bauhaus is building digital twins of biological cells to quickly and cheaply explore the effects of genetic changes on cellular behaviour.

*Cell Bauhaus Co-founders Dr Megan Coomer and Professor Michael Stumpf at Melbourne Connect*

*"Seeing more academics successfully commercialising their ideas, researchers can appreciate that they can be amazing scientists and great entrepreneurs."* Dr Megan Coomer

"Firstly, we hope our research will unlock widespread adoption of genetically modified organisms to produce sustainable chemistries that will reduce our reliance on fossil fuels and revolutionise the way we manufacture everything from food to fuel," Dr Cooomer says. "Secondly, we hope to help advance precision medicine by modelling a patient's response to a particular concentration or combination of drugs, based on unique genetic profiles."

With an ongoing goal to deepen understanding of an organism's genome, Cell Bauhaus is exploring how gene-editing technologies can be used by bioengineers to design and engineer cells as precisely as aeronautical engineers design planes.

## Going to market

Still in an early exploratory phase, Cell Bauhaus has unearthed tools and attracted significant investments made by Tin Alley Ventures and the University of Melbourne Genesis Pre-Seed Fund.

"Our ideas, our science and our technology have deep and long-standing roots in fundamental research," says Professor Michael Stumpf, Co-Founder and CSO at Cell Bauhaus.

"But ultimately, successful impact requires a combination of research excellence and commercialisation. Genesis and Tin Alley have provided us with office space and equipment, access to marketing and branding resources and commercialisation experts," he explains, "and are helping to foster relationships in the University's innovation ecosystem as well as globally. Universities, like Melbourne, are in a position to fundamentally change the future."

## The outcome

In operation for only six months, Cell Bauhaus has already attracted outstanding students and graduates from leading international universities.

"The excitement of early career researchers appears to be shared by funders in the United States and Europe and we're optimistic about our chances to grow Cell Bauhaus internationally," Professor Stumpf says.

With a determined global focus, the Cell Bauhaus team is forging a clear pathway for its researchers to contribute to industry within the University of Melbourne ecosystem, helping spark ingenuity and progress that puts Australia on the map as an international player in the startup space.

"Seeing more academics successfully commercialising their ideas, researchers can appreciate that they can be amazing scientists *and* great entrepreneurs," says Dr Coomer.

## Ecosystem support and success

$500,000 funding from University of Melbourne Genesis Pre-Seed Fund, University team support and co-working office space

$800,000 of a committed $1.7 million investment from Tin Alley Ventures

**Impact pathway**

**Startup**

# Culturally responsive tool transforming child health screenings for Aboriginal and Torres Strait Islander children

| | |
|---|---|
| **Year established:** | 2016 |
| **Sector:** | Healthcare |
| **Faculty:** | Faculty of Medicine, Dentistry and Health Sciences |
| **People:** | Associate Professor Anita D'Aprano<br>Department of Paediatrics<br>Faculty of Medicine, Dentistry and Health Sciences<br>Founder and Clinical Lead, ASQ-TRAK |

**It is widely recognised that early intervention in a child's life plays a crucial role in securing positive long-term outcomes. As such, a team from the University of Melbourne is working on creating specialised early childhood screening tools for Aboriginal and Torres Strait Islander children. The goal of these tools is to increase access to developmental screenings, giving every child the greatest chance at a safe and healthy future.**

One of the standard tools used by early childhood professionals to measure development is the globally recognised Ages and Stages Questionnaire[1] (the ASQ®-3). It is widely used screening tool, however because it was developed in the US for non-Indigenous children, it doesn't consider the unique factors and environments impacting the childhood experiences of Aboriginal and Torres Strait Islander peoples. Paediatrician Associate Professor Anita D'Aprano realised that because of this lack of cultural context, it simply wasn't being used in clinical settings in remote Australia. It was this realisation that led to development of the culturally responsive ASQ-TRAK screening tool for Aboriginal and Torres Strait Islander children[2].

"Using a tool like the ASQ-TRAK will enable earlier detection of developmental difficulties, meaning earlier access to interventions that will transform trajectories over the course of a child's life" explains Associate Professor D'Aprano.

## The research

The ASQ-TRAK tool[3] was developed from the ASQ®-3 and adapted by Associate Professor D'Aprano, ASQ®-3 authors, and Aboriginal community partners. The tool was in development for about two years and includes features such as plain language for ESL users, and images in addition to text to demonstrate developmental stages. Qualitative studies[4] involving Aboriginal Health Workers, allied health workers, and caregivers in urban, regional and remote settings found the adapted tool to be culturally relevant.

Associate Professor D'Aprano commenced her post-doctoral research through the University of Melbourne in 2014 and it was during this work that the tool was validated. "There was growing interest from practitioners on the ground who wanted to use the tool. I was talking about it at conferences and more people started to show an interest in using it. This interest and need progressed to validation of the ASQ-TRAK, so that we could be confident in its accuracy."


*The second iteration of the tool, ASQ-TRAK 2, is being used by healthcare workers, educators and other childcare professionals in Aboriginal and Torres Strait Islander communities to help track children's development.*

The involvement of key partners in this development and validation phase was critical for its cultural relevance and accuracy. This increased its uptake once it was finalised as a viable tool for clinical use. "It was important to work with partners such as the Department of Health in the NT, who provided essential local access to community partners. Then partnering with Congress (an Aboriginal Community Controlled Health Organisation in Alice Springs) and Families as First Teachers (FaFT - NT Department of Education) on the validation study, connected them to the project in a way that increased the chance of the product being implemented."

## The business model

As demand for the ASQ-TRAK tool and the accompanying practitioner training increased, the team grew. "We couldn't continue to operate at small scale so in 2019 we partnered with the Royal Children's Hospital for distribution of the tool[5]. We continued doing the research, but we also had to learn what was involved in building up the commercial side of it."

This was where the University's commercialisation team became invaluable. "The knowledge and tech transfer team gave a lot of advice and support – and continue to. They work closely with the legal team and have been fundamental with advice on things like IP and developing the licencing and end-user agreements."

## The impact

The hope for Associate Professor D'Aprano is that clinical implementation of the ASQ-TRAK tool will transform the lives of Aboriginal and Torres Strait Islander families and in time, contribute to longer, stronger futures. "My goal is to see that all Aboriginal and Torres Strait Islander kids have access to the best culturally responsive developmental care and support so they can reach their full potential and have success throughout their life."

This vision is reflected in the successes achieved so far with over 1000 ASQ-TRAK kits distributed nationally through around 160 different organisations – almost 60 of them Aboriginal Community Controlled Health Organisations (ACCHO). More than 1000 staff have been trained to use the tool across all sectors in remote, rural, and urban parts of Australia. In 2023, the tool was developed further and the ASQ-TRAK2 now includes all 21 age intervals between two months and 5 ½ years.

"As we scale up, we'd like to partner with Aboriginal and Torres Strait Islander peak bodies to secure more funding to enable us to build a sustainable workforce that delivers the solution in an affordable way to those who need it most."

*The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).*

1 https://agesandstages.com/
2 https://www.strongkidsstrongfuture.com.au/
3 https://www.strongkidsstrongfuture.com.au/asqtrak/
4 https://findanexpert.unimelb.edu.au/scholarlywork/934540-adaptation-of-the-ages-and-stages-questionnaire-for-remote-aboriginal-australia
5 https://shop.rch.org.au/product-category/asq-trak/

## Ecosystem support and success

- 1000 kits distributed nationally in partnership with the Royal Children's Hospital
- Distribution through 160 organisations nationally and implemented across NT, SA, WA, QLD, NSW, Victoria, and Tasmania
- Almost one third of Australia's ACCHOs reached
- More than 1000 staff trained across all sectors nationally
- Support from the University of Melbourne Social Ventures Exchange (SVx)
- Development of national partnerships with Aboriginal and Torres Strait Islander peak organisations and reference groups to support ongoing research
- Creation of additional culturally safe clinical environments for early childhood screening of Aboriginal and Torres Strait Islander children
- Reframing of systemic approaches to Aboriginal and Torres Strait Islander children's health care
- Improved access to NDIS support for early interventions thanks to NDIS endorsement

**Impact pathways**

**Licencing**

**Social venture**

RUBICON™

# Longstanding collaboration works to automate some of the world's largest irrigation systems

**Year established:** 1998

**Sector:** Envirotech

**Faculty:** Faculty of Engineering and Information Technology

**People:**

**University of Melbourne**

Professor Erik Weyer
Electrical and Electronic Engineering

Professor Michael Cantoni
Electrical and Electronic Engineering

Professor Andrew Western
Head of Infrastructure Engineering

Professor Dongryeol Ryu
Infrastructure Engineering

Professor Iven Mareels
formerly of Electrical and Electronic Engineering

**Rubicon Water**

Matt Ryan
General Manager – Technical Services

Dr. Adair Lang
Innovation Manager

Dr. Yuping Li
Senior Control Engineer

As the global population grows and climate shifts, the irrigated agriculture industry faces increasing pressure to produce more food with less water. Since the late 1990s, Melbourne-headquartered Rubicon Water has partnered with the University of Melbourne to collaborate on the development of automated canal network technologies, resulting in significant water conservation, drought resilience, and increased crop yields both in Australia and across the globe.

## The need

Amidst a growing global population and the escalating impacts of climate change, there is an urgent call for sustainable water management in agriculture. Irrigation, crucial for food security, currently consumes 70% of the world's available freshwater resources, with the majority drawn from surface water sources. On average, approximately only half of the water released for irrigation is used by the crop[1], meaning enormous potential for global water conservation with the other half.

Rubicon Water was established in 1995 with a focus to sustainably increase global food and fibre production by improving the management of irrigation water in gravity canal systems – the major source of water loss within the irrigation industry.

The technology automates traditional manually-operated canal networks to provide an on-demand supply for irrigators, while at the same time transforming these networks from a typical 50-60% distribution efficiency to over 90%.

Projections towards the year 2050 state that agriculture will need to produce 56% more food and fibre to feed the world's population[2]. Therefore, enhancing irrigation efficiency to improve both water productivity and food production is critical.

## The partnership

In the late 1990s, Rubicon approached Professor Iven Mareels, an international expert in control theory, who had recently joined the Department of Electrical and Electronic Engineering (EEE) at the University of Melbourne, to collaborate on the development of modelling and control algorithms to progress the automation of canal networks. With access to real world data, a team of academics, students, and engineers from Rubicon worked together to develop tailored control algorithms—crucial for coordinating precision-engineered hardware, water management software, and sophisticated communication technology—bringing the desired objectives within reach.This control engineering work has continued across two decades, with Professor Erik Weyer and Professor Michael Cantoni in EEE taking the lead since 2003, securing five ARC linkage grants in the process.

## The progress

Rubicon's first large-scale implementation was in Northern Victoria, Australia. With initial pilots commencing in 2003, the project now conserves over 430 million cubic meters of water per year, with over 15,000 interconnected solar-powered gates accurately measuring and controlling water flow to growers located across 400,000 hectares.

"Irrigated agriculture covers approximately 2.5 million hectares of land across Australia, predominately located within the Murray-Darling Basin" says Rubicon Water's CEO, Bruce Rodgerson, "However, Australia represents less than 1% of the world's irrigated land, presenting enormous potential for our technology in international markets such as the United States, Europe, Central Asia and India."

Rubicon recently delivered one of the largest automation projects of its type across the world in India on the Narayanpur Left Bank Canal, where farmers located at the end of the system are reporting receipt of water for the first time in decades. To date, they have produced over 35,000 control and measurement devices in more than 20 countries, with approximately 70 per cent of Rubicon's revenue now generated internationally.

In September 2021 Rubicon made its debut on the Australian Securities Exchange (ASX:RWL) to support its global expansion strategy and accelerate growth throughout key identified markets.

## The outcome

Today, the control algorithms developed from the partnership are operating in large-scale irrigation networks used to efficiently distribute billions of litres of water every year. Recently, Rubicon expanded its collaboration to include a team of researchers from the Department of Infrastructure Engineering, led by Professor Andrew Western, using weather and satellite data to determine soil moisture.

In addition to the technological breakthroughs, Rubicon and the University have filed over 70 joint patents. With the support of six Australian Research Council (ARC) Linkage grants and other Federal Government grants, the partnership activities have been added to course content components for students in the Department of Electrical and Electronic Engineering, leading to multiple career opportunities. Rubicon has gone on to employ a number of researchers engaged in this work who continue to be employed by the company today.

*Rubicon FlumeGate regulating site measuring and controlling the flow of water in Chile.*

1 FAO AQUASTAT, 2012
2 WRI, 2018

## Partnership success

- Debut on Australian Securities Exchange to support its global expansion strategy
- 70+ joint filed patents, 19 currently live
- Secured multiple grants for collaborative research between Rubicon and the University of Melbourne, including six Australian Research Council Linkage Projects and other Federal Government grants
- 11 Post-docs, 8 PhD scholars and 2 M.Phil. students working on Rubicon projects over 20+ years

**Impact pathways**

**Licencing**

**Partnership**

# Old tyres reborn as permeable pavements to save water

| | |
|---|---|
| **Year established:** | 2020 |
| **Sector:** | Envirotech |
| **Faculty:** | Faculty of Engineering and Information Technology |
| **People:** | Associate Professor Mahdi Disfani<br>University of Melbourne<br>Co-founder and Head of Research and Development at Porous Lane<br><br>Dr Amir Mehdizadeh<br>University of Melbourne<br>Co-founder and Managing Director at Porous Lane |

With tens of millions of tyres dumped every year in Australia and across the world, a Melbourne-based engineering startup has developed new technology to commercialise highly permeable, environmentally friendly pathways that capture and reuse water for a healthier environment.

## The need

Fifty-eight million used tyres are discarded in Australia every year, with less than 10 per cent being repurposed. In addition to this waste problem, urban centres are becoming more densely populated than ever, with flooding and the associated run-off rainwater contaminating precious local waterways and posing health risks to humans and nature alike.

One of the reasons this polluted flood run-off makes its way back to natural water sources is because current road materials are not permeable. Although permeable pavements have been used for decades locally and in Europe, they have mainly used unsustainable crushed quarried rock that requires carbon-intensive processing before use and thus, ironically, continues to contribute to environmental damage.

"Current conventional products are suitable for children's playgrounds and landscaping," says Associate Professor Mahdi Disfani, a geotechnical engineer and Head of Research and Development at Porous Lane. "But roads and pavements are everywhere. We need to find a better solution."

## The research

Associate Professor Disfani and his colleague Dr Amir Mehdizadeh, in the University of Melbourne's Faculty of Engineering and Information Technology, are the driving forces behind Porous Lane, the research-based startup dedicated to creating healthier waterways, cooler cities and a sustainable circular economy.

*"Tens of thousands of tyres have been diverted from Victorian landfills and illegal piles, supplying more water for trees and ensuring less pollution in precious city waterways."* - Associate Professor Madhi Disfani

The two geotechnical engineering experts were driven by a mission to seriously reduce the number of tyres that end up in landfills, stockpiles and illegal dumps. Confident with their new product idea, they joined forces in 2016 to test development of permeable pavements made of recycled tyres in their University of Melbourne laboratory

During the following four years, they conducted successful field trials in partnership with local councils in Melbourne and Adelaide, and with support from the University of Melbourne, Tyre Stewardship Australia and Sustainability Victoria. The trials tested an optimum blend of paving that provided enough flexibility to reduce cracks caused by movement of natural ground or tree roots – but didn't become unstable under traffic loads.

"Using all the qualities that make the humble tyre great – sturdiness, elasticity and reliability – we created a surface that squeezes tyre particles tight to quickly create rigidity when supporting heavy loads, such as trucks, cars, buses and bikes," says Associate Professor Disfani. "And that also helps with stormwater management and flood mitigation".

*Porous Lane has engineered a permeable pavement material made up of up to 60% Australian recycled tyres and locally sourced virgin rock, which is not only sustainable but helps reduce flood water run off and subsequent water contamination.*

## Going to market

The laboratory and field trials proved that Porous Lane pavements were cheaper, more durable, and easier to maintain than the current offerings, with the added benefit of using at least 50 per cent recycled content – meaning the team had a commercially viable and environmentally-friendly product on their hands. From there, they started to explore commercialisation opportunities via the University's ecosystem.

"Mentorship by some of the best entrepreneurs in this space was critical to our success, including from the University's Melbourne Entrepreneurial Centre and Translating Research at Melbourne (TRAM). It provided us with essential training to understand the commercial process, and with significant support from the University's Business Development Director, Tech Transfer and IP teams that gave us the time and advice to embark on the startup journey with confidence."

## The outcome

Porous Lane's clients now include local councils throughout South Australia, New South Wales, Queensland, the Australian Capital Territory and Victoria, and their solution is used widely for tree protection zones, footpaths and bicycle paths.

"Importantly, tens of thousands of tyres have been diverted from Victorian landfills and illegal piles, supplying more water for trees and ensuring less pollution in precious city waterways," says Professor Disfani.

## Ecosystem support and success

- Investment of $750k, with $1.5 million committed from Tin Alley Ventures
- 18,000 tyres diverted from Victorian landfills
- Premier's Sustainability Awards 2023 – Waste and Recycling Solutions – Community Champion
- Tidy Towns Sustainability Awards Shortlist: Waste Prevention and Reduction category
- $25,000 TRAM seed funding
- Access to TRAM Track, TRAM Runway and TRAM Air programs through the Melbourne Entrepreneurial Centre and expertise in translating IP into a viable business
- TRAM Air support to ensure investment readiness and secure investment funding
- Tech Transfer support to define IP proposition
- Mentorship and access to event and investment networks
- Access to office, lab and facilities

**Impact pathway**

**Startup**

# EarGenie®

EarGenie ® is a device that offers early interventions for infants with hearing and language disorders, giving them a brighter future. NIRGenie, a spinout of the Bionics Institute, has been established through funding from the University of Melbourne and Bionics Institute to commercialise EarGenie®.

**Read more impact stories like NIRGenie here**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