

# Research Impact Report 2023

*This report was prepared by the Research Impact Team with assistance from the La Trobe research community. Text © Helen Slaney & Matt Thomson 2024. For queries or corrections please contact [impact@latrobe.edu.au](mailto:impact@latrobe.edu.au)*

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### **Acknowledgement of Country**

La Trobe acknowledges that our campuses are located on the unceded lands of many traditional custodians in Victoria and NSW. We recognise their ongoing connection to the land and value their unique contribution to the University and wider Australian society.

La Trobe University is committed to providing opportunities for Aboriginal and Torres Strait Islander people, both as individuals and for communities, through learning and teaching, research and community partnerships across all our campuses.

We pay our respects to Elders past and present and thank them for their ongoing care of the land, skies, and waterways of this beautiful country.

We acknowledge our Indigenous staff for their valuable contributions, dedication and ongoing support of our strategic objectives.

# FOREWORD: IMPACT AT LA TROBE

## Research Impact Strategy

La Trobe's Research Impact Strategy was refreshed for the period 2023-2025. Our priorities include aligning our research with the UN Sustainable Development Goals and ensuring that we meet the needs of industry, government and community partners. Recognising that global impact begins on a local level, we are proud of our achievements in regional Victoria as well as internationally.



## Pathways to impact in 2023

The launch of two new flagship institutes, the Care Economy Research Institute (CERI) and La Trobe Institute for Sustainable Food and Agriculture (LISAF) reflected our priority areas of health and wellbeing and food security. We also welcomed biotechnology partner BioNTech to our Innovation Precinct, and established a community of practice for public involvement in research.



## A note on our data

In 2023, La Trobe introduced a custom-designed impact tracking module into our central research management platform, PRIME. This enables impact and pathways to impact to be tracked for every project recorded in PRIME. As well as narratives, PRIME captures structured data including:

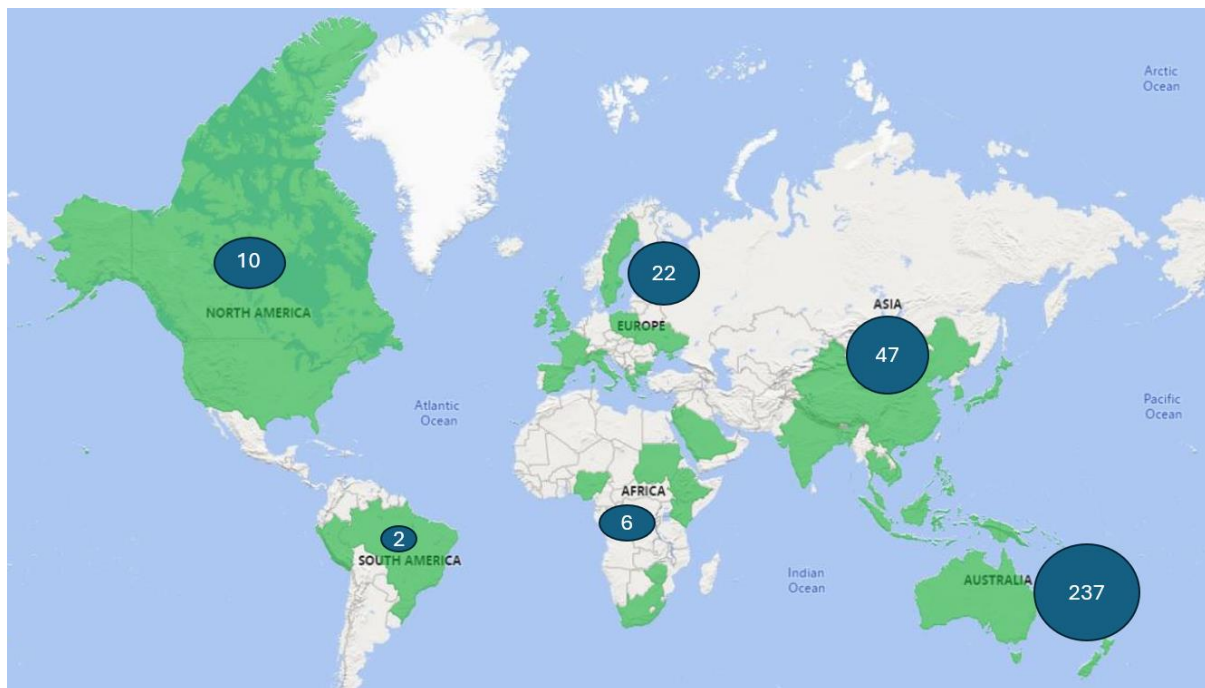
- Geographical reach
- Sustainable Development Goals
- Impact types
- Impact indicators.

There are currently almost 800 projects registered for impact tracking, representing all academic Schools and fields of research.



# GEOGRAPHICAL REACH

La Trobe's research is making a difference in over 40 countries globally.



Projects per region

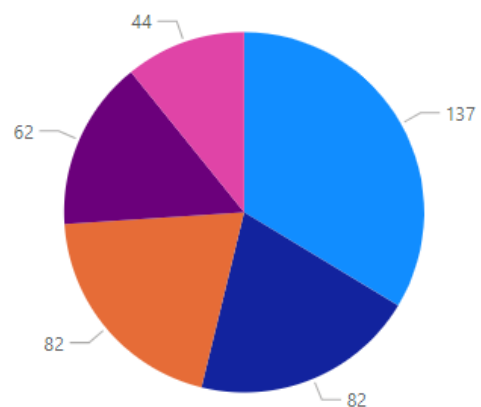
# TOP 5 SUSTAINABLE DEVELOPMENT GOALS

Our contribution is most evident in the areas of health, equity, community, innovation and governance.



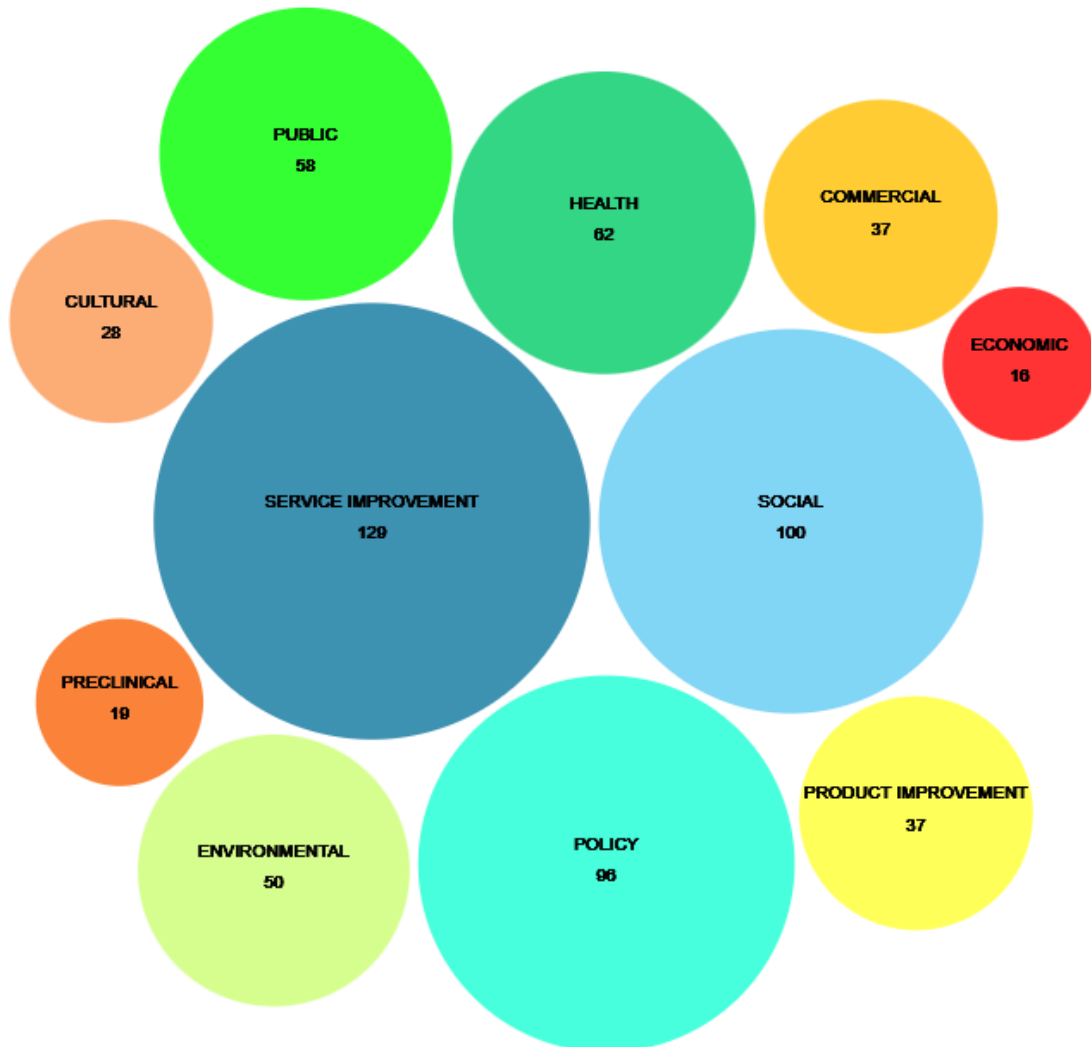
## Sustainable Development Goals (SDGs)

- SDG3: Good Health & Wellbeing
- SDG10: Reduced Inequalities
- SDG11: Sustainable Cities & Communities
- SDG9: Industry, Innovation & Infrastructure
- SDG16: Peace, Justice & Strong Institutions



# TYPES OF IMPACT

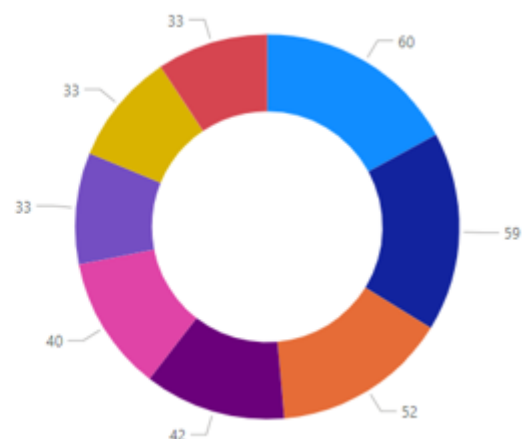
Our research makes a difference across many different areas of society. Our greatest impact has been in social wellbeing, policy change, and improvements to services.



Our top indicators of impact include....

## Indicators

- Use of research by government agency
- Enhanced professional capability/knowledge
- Improvement in service delivery
- Improvement to professional practice
- Improved equity of access, inclusion or inclusivity
- Change to legislation, policy or guidelines
- New health product or service available to consumers
- Social benefit as defined by community



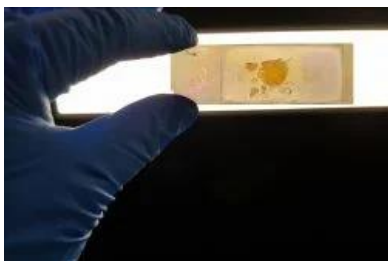
# UNDERSTANDING AND PREVENTING DISEASE

Both in Australia and globally, La Trobe is leading the development of world first discoveries, trials, treatments and technologies in the fight against disease.



## Pathways to impact in 2023:

- Global biotechnology company **BioNTech** is establishing an mRNA facility at La Trobe to manufacture new investigational mRNA therapies for serious diseases including cancer.
- The **Olivia Newton John Cancer Research Institute** is leading a \$4 million project to create Australia's first [advanced lung cancer biobank](#). Using minimally invasive techniques, the biobank has begun collecting tissue samples to investigate the causes of immunotherapy resistance.
- We have launched a major spin out company **AlleSense** to support the commercialisation of the world-first, [Eureka Prize](#) winning, nanofabricated microscope slide, **NanoMSlide**, which uses colour contrast to easily and quickly identify abnormal cells in a suspect sample. [Read the article in Nature](#).
- La Trobe researchers are continuing a long-term partnership with biotech company [VivaZome Therapeutics](#), now co-located at the University, to develop and commercialise **exosome therapy** as part of a Cooperative Research Centre Project led by VivaZome.



*NanoMSlide represents a major advancement in cancer diagnosis.*



*Professor Warwick Grant working with communities in Africa*

- The **Baker Department of Cardiovascular Research, Translation and Implementation** at La Trobe features the only high-throughput [lipidomic platform](#) in Australia. The research team are working on a machine learning pipeline and reference library which will derive the full coverage of the plasma lipidome, from a short, 2-minute sweeping mass spectrometry scan.
- With funding from the WHO, the Bill and Melinda Gates foundation, the NIH and the END fund – worth over \$4 million - Professor Warwick Grant's lab is working with collaborators in sub-Saharan Africa to develop and embed tools to assist decision making for **onchocerciasis ('river blindness') elimination**.
- Stephanie Gras has uncovered a genetic basis for strong **immunity against COVID-19**, opening the way for better vaccines and treatment. [Read the article in Nature](#).



# UNDERSTANDING AND PREVENTING DISEASE

## CASE STUDY:

### La Trobe and AdAlta: A Breakthrough Antibody Treatment for Malaria

AdAlta's *i-bodies* combat the deadliest strains of malaria.



[AdAlta](#) is an ASX listed biotech company embedded in the **La Trobe Institute for Molecular Science**.

AdAlta's Founding Chief Scientist is La Trobe's Professor Michael Foley, and the company [credits much of its success](#) to the essential resources and facilities supplied by the University and the expertise of its researchers. AdAlta's flagship technology is the [i-body](#)<sup>®</sup>: a next generation antibody-like molecule with wide potential therapeutic application which is covered by numerous patents involving named inventors from La Trobe (including Foley and Emeritus Professor Robin Anders).

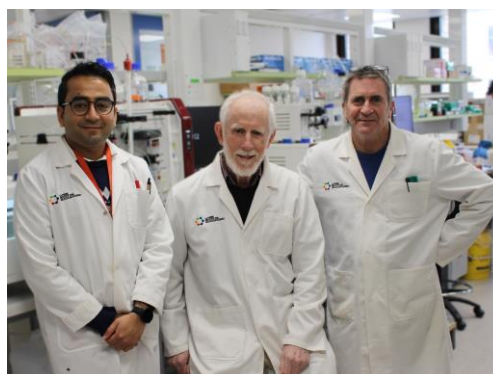
AdAlta has built up a library of over 20 billion i-bodies as part of its drug discovery platform, which can be screened against disease targets to identify specific i-bodies for therapeutic treatments. The scale and utility of the library has led to [collaborations](#) with major pharmaceutical companies including

GE Healthcare and Carina Biotech, and AdAlta has also used the technology to develop AD-214, a therapeutic for Idiopathic Pulmonary Fibrosis (IPF) which has passed Phase I clinical trials.

The most recent La Trobe-AdAlta discovery, however, relates to a **world first in the treatment of malaria**. AMA1 is the protein found in the Plasmodium blood parasite which allows malaria to invade human blood cells. The major challenge in treating malaria is the high degree of variability of AMA1 from strain to strain and over time. Until now, this variability had meant that no antibody-like molecule had been able to combine the ability to bind strongly to multiple strains of the parasite with high potency killing.

But having identified two evolutionarily distant strains of AMA1, PhD student Dimuthu Angage panned through the billions of i-bodies in the library to see which would bind to them both successfully. Angage uncovered [for the first time](#) two molecules – WD33 and WD34 – that act as cross-reactive binders against all malaria strains of *Plasmodium falciparum*, the deadliest and most prevalent malaria species.

*Dimuthu Angage, Robin Anders, and Mick Foley*



Read more about our [Impact in Understanding and Preventing Disease](#) and the [research behind it](#).

# SOCIAL CHANGE AND EQUITY

Achieving social justice and equality requires long term and sustainable action to close the inequity gap.



## Pathways to impact in 2023:

- Prof. Andrea Carson analysed the use of media and social media during the 2023 **Voice to Parliament referendum** to determine key messages that shaped the “No” outcome. Carson and colleagues also traced the role of disinformation during the campaign, especially messages that targeted the voting process. She delivered this [analysis](#) to Meta (Facebook) and has made recommendations to the Australian Electoral Commission and Victorian Electoral Commission on strategies for managing disinformation during future electoral campaigns.



In 2023, a statue commemorating activist Zelda D'Aprano was unveiled at Trades Hall, Melbourne.

- Prof. Clare Wright co-convenes the community campaign “**A Monument Of One’s Own**” (AMOO) to address the gender imbalance of statues in public space. By closing the gap in commemorative representation, AMOO’s objective is to have the historical achievements of women recognised as equally worthy of respect. In direct response to pressure from AMOO, the State Government launched the [Victorian Women’s Public Art Program](#) in 2021. Six statues have already been commissioned to honour Victorian women, including three Indigenous artworks and designated sites in regional locations.

- Dr Makiko Nishitani’s work with young Pacific Islander adults revealed an overwhelming need for accessible careers information and role models from a similar cultural background. The [Pacific Islander Network](#) represents a wide range of careers and diverse routes to realising professional success, challenging stereotypes and offering relatable role models. Inspired by **Pacific Role Models**, Microsoft began offering free training in IT skills in 2023 to a cohort of young Pacific people in regional Victoria.
- The exploitation of fishing crew in distant water (DW) fisheries is a major human and labour rights issue across Southeast Asia and the Pacific. Dr Sallie Yea worked in partnership with the Department of Foreign Affairs and Trade (DFAT) as part of the ASEAN-ACT (the **Association of Southeast Asian Nations-Australia Counter Trafficking Initiative**), conducting legal reviews of human trafficking in fisheries cases in Thailand, Cambodia, Indonesia and the Philippines.



*‘The information from the research has been summarised as country-specific fact sheets which include key recommendations to strengthen the justice response to trafficking in the fishing sector, and improve access to protection, services and remedies for victims.’*

- ASEAN



# SOCIAL CHANGE AND EQUITY

## CASE STUDY:

### Inclusive and Equitable Education

The [Science of Language and Reading \(SOLAR\) Lab](#), which promotes evidence-based literacy across all school years, was recognised by the Bertalli Foundation with a **\$2.5m investment to support its expansion across regional Victoria**.

A partnership with the Australian Education Research Organisation (AERO) also enabled SOLAR professional learning to be implemented in 22 Victorian schools, and specialist school-based coaching in 10 of these, improving essential literacy for hundreds of children. Over 10,000 participants have completed SOLAR's online courses on the linguistic and cognitive foundations of reading, including classroom teachers, school literacy leads, principals and allied health clinicians.



La Trobe's **School of Education** celebrated some outstanding successes in 2023.

The [Nexus Teacher Placement Program](#) also expanded substantially. Based on research that determined the barriers to teacher retention, Nexus is a first-of-its kind pathway into secondary teaching which embeds high-performing teachers in schools identified as hard-to-staff, with a particular focus on low socio-economic, rural and regional communities.

86% of Nexus graduates have continued working in low SES schools. **The success of Nexus prompted its expansion into primary schools in NSW and Victoria**, with the Commonwealth Government committing \$7.9m over a further three years. Nexus was recognised with a 2023 Shaping Australia Award for its innovative approach to community engagement.

## CASE STUDY:

### Repatriation of the Yirrkala Bark Petition

In 1963, the Yolngu people of north-east Arnhem Land sent four petitions on traditional painted bark to federal Parliament, representing the historic first step in the Aboriginal land rights movement. Only three were believed extant until Prof. Clare Wright located the fourth, "missing" petition in private ownership.



*Copies of the Bark Petition are displayed in Parliament House and the National Museum of Australia.*

In 2023, this 'lost treasure' was at last ceremonially repatriated to Country, facilitated by Prof Wright in consultation with community, and is now permanently displayed in Yirrkala's Buku-Larrnggay Mulka Art Centre. The National Museum of Australia has updated its educational content with the fourth petition's rediscovery and repatriation. A feature documentary film following the repatriation, directed by Prof Larissa Behrendt, is in development for NITV.

Prof. Wright also chaired a panel of Yolngu elders at the opening in Washington DC of a high-profile international exhibition of Yolngu bark paintings which will tour the USA for two years. Prof Wright's book on the history of the Yirrkala Bark Petitions, *Näku Dhäruk*, is in press with Text Publishing.

# SOCIAL CHANGE AND EQUITY

## CASE STUDY:

### Human Security & Social Change

La Trobe's [Centre for Human Security and Social Change](#) (CHSSC) works with a wide range of organisations in Indigenous Australia, the Pacific and Southeast Asia to better understand, support and enable the front-line practice of social change.

In 2023, the CHSSC worked with nine partners in the Pacific and Southeast Asia to deliver 16 projects which demonstrated how a more evidence-based, learning-orientated and locally led development practice can lead to better development outcomes.



Timber posts being prepared by local carvers to rebuild the Malvatu Mauri Nakamal (meeting house), Vanuatu.

## HIGHLIGHTS IN 2023 INCLUDED:

1. The CHSSC worked with local researchers to produce [three case studies](#) for The Asia Foundation's **Coalitions for Change** (CfC) program which analysed routes to successful policy reform in challenging political contexts. The findings have been integrated into the Foundation's "[Development Entrepreneurship](#)" online training course which equips social change activists with ways of working that can help them progress policy reform in their own contexts.

*'The Centre's broad and deep knowledge of international development theory, practices, and specific projects helped us to the policy reform experiences that we were looking for.'*

- Rene Sanapo  
Leadership Component Lead, Coalitions for Change

2. The CHSSC worked with Pacific researchers to produce [three country studies](#) for **UNDP** which document Pacific understandings of and approaches to accountability. Building on this research, "Fellowship Schemes" are now being established to pilot new approaches to accountability in context-specific ways in Vanuatu, Solomon Islands and Tuvalu.

*'Thanks to the detailed research and the ability of the La Trobe team to adapt to our specific context... we're able to utilize the information for our targeted in-country engagements and we've just deployed our team for missions across the region to follow-up on the data and mappings.'*

- Marine Destrez  
Program Manager, UNDP Pacific.

3. The CHSSC worked with Pacific researchers to identify how the [Women Leading and Influencing](#) (WLI) program can effectively engage with men in the Pacific to build support for **women's leadership**. The recommendations from their review have been integrated into WLI's leadership development programs, and key insights shared with the broader development community in the Asia Pacific.

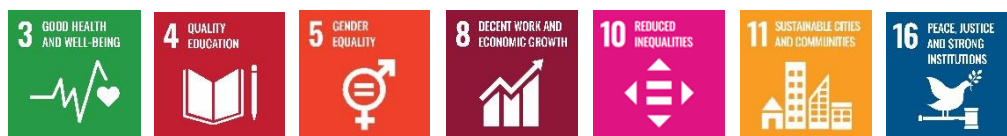


Mercy Masta and male allies at the WLI residential intensive in Brisbane in September 2023. Credit: Quince and Mulberry Studios

Read more about our [Impact in Social Change & Equity](#) and the [Research behind it](#).

# HEALTHY PEOPLE, FAMILIES AND COMMUNITIES

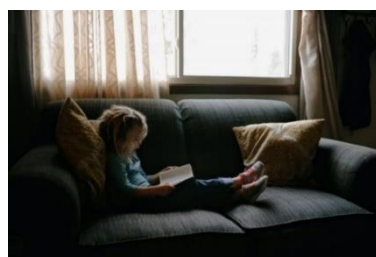
Promoting physical, mental and emotional health and wellbeing for all individuals and across all stages of life is key to the creation of inclusive, equitable and prosperous societies.



## Pathways to impact in 2023:

- Groundbreaking research on alcohol's harm to others (AHTO) is being led by Anne-Marie Laslett in the **Centre for Alcohol Policy Research (CAPR)**. An international database on AHTO from 9 countries was developed at CAPR, and this has since been expanded to include 34 countries by Laslett's international team. She is leading the co-development of the AHTO program with international researchers, policymakers, and national public health organisations in different WHO regions to have this work embedded in and inform health and social policy.
- Type 2 diabetes (T2D) and hypertension (HTN) are leading causes of death worldwide, with over 60 million people in Europe living with diabetes. The [DigiCare4You implementation study](#), targeting more than 15,000 families in four European countries, involves a two-stage screening procedure to identify parents at high risk, followed by participation in an intervention program involving digital self-monitoring alongside support from health professionals. Over 18,000 parents/caregivers in total have been screened during the first stage and more than 800 parents/caregivers living with prediabetes and >350 living with T2D are now using the DigiCare app.

In 2023, consortium partners led by Prof George Moschonis published two articles in *The Lancet* demonstrating that **digital tools can have a positive impact on glycaemic control and blood pressure** for adults with T2D or HTN.



*In Victoria, more than 9000 children live in OOHC.*

- Children in out of home care (OOHC) are more likely to have experienced abuse and neglect, which can adversely impact health and wellbeing throughout their whole lives. To address this disparity, Department of Families, Fairness and Housing in the Mallee, Sunraysia Community Health Services, Mildura Rural City Council Maternal and Health Service, and Mallee District Aboriginal Services collaborated with Dr Corina Modderman's team to implement the **Integrated Health Systems initiative**.

A registered nurse is appointed as "health navigator" to support child protection practitioners and clinicians in navigating health systems and align health care needs for children in care. There are now 50+ children identified through the Integrated Health Systems project that are supported with their health needs, and a dedicated paediatric clinic for children in OOHC runs monthly at Mildura Base Public Hospital.



# HEALTHY PEOPLE, FAMILIES AND COMMUNITIES

## CASE STUDY:

### FitSkills

**FitSkills**, established by Nora Shields, is a 12-week community exercise program developed to address the needs of young people with disability aged 13 to 30 years. The program has received funding from the NHMRC and VicHealth, and has won awards from VicHealth and the European Academy of Childhood Disability.

[Down Syndrome Victoria](#) began offering a pilot program, 'DSV FitSkills' in 2023 with support from an Access All Abilities grant (Victorian Government), and has continued to offer it in 2024 as a service recognised under the NDIS.

## CASE STUDY:

### Sport and Exercise Medicine



*The **La Trobe Sport and Exercise Medicine Research Centre (LASEM)** is one of 11 international research centres for the prevention of injury and protection of athlete health supported by the International Olympic Committee.*

Researchers within LASEM established the multi-site web platform [TREK Education](#) to make research evidence accessible and implementable to everyone. It includes the [My Knee Cap](#) information portal, which is listed as a trusted resource for treating patellofemoral pain by the Royal Australian College of General Practitioners (RACGP) in their Handbook of Non-Drug Interventions (HANDI).

Since 2017, LASEM researchers have been accelerating the implementation of national guidelines into clinical practice via [GLA:D® Australia](#) (Good Life with Osteoarthritis). The program is now being offered with no out-of-pocket costs by private health insurers including HBF and Bupa and has been implemented at 788 public and private health services, covering all states and territories in Australia.

## CASE STUDY:

### Victorian Virtual Emergency Department



*Virtual EDs have been rolled out across Victoria.*

Northern Hospital Epping has one of the busiest emergency departments in Victoria, with significant numbers of the community not seemingly being patients of a local GP and therefore turning to the Northern ED nurses for treatment and care. The COVID-19 pandemic only exacerbated these pressures. In response to the demand, Northern Health partnered with La Trobe University researchers to pilot a virtual emergency department to offer a triage service to patients at home. Northern Health's virtual emergency department has proved immensely successful since it began in October 2020, allowing patients – including those with COVID-19 – to talk to emergency nurses and doctors from their home or work.

The virtual ED's success encouraged other health services to replicate it. A partnership with Ambulance Victoria now allows paramedics to use the service from a patient's home and receive emergency medical advice and care. This virtual triage service has received \$21 million in Victorian government investment to roll out across Victoria. By July 2023, VVED avoided 81,248 emergency department presentations, representing a cost saving of \$54m. 93% of patients reported the experience as positive/extremely positive.

In 2023, a partnership between La Trobe, Northern Health and the Digital Health CRC was established to evaluate the statewide model.



# HEALTHY PEOPLE, FAMILIES AND COMMUNITIES

## CASE STUDY:

### Early Pre-diagnostic Support for Autism

Autism is a key public health consideration with more than 50% of Australian children registered under the National Disability Insurance Scheme (NDIS) having support needs primarily related to Autism.



*Whilst autism is identifiable by the first birthday, it is often detected until years later, resulting in delays to support.*

Since 2016, La Trobe University's Childhood Autism and Parenting Team (CAPTeam) has worked with collaborators at the Olga Tennison Autism Research Centre (OTARC) and Perth-based CliniKids team to evaluate a very early-in-life parent-led program that is begun pre-diagnostically and seeks to support the development of babies displaying early signs of autism. The [Australian Infant Communication and Engagement Study](#) (AICES) showed for the first time that substantial child development gains can be achieved in just 10 hours of in-home parenting support sessions, when begun around their infant's first birthday, significantly reducing the likelihood that the child meets the deficit-focused diagnostic criteria for autism in early childhood.

In the National Disability Insurance Scheme (NDIS) context, this low-cost early support can offer excellent return-on-investment, estimated at over \$10,000 in savings for post-diagnostic support costs per child to age 12 years. In May 2023, the Federal Government announced over **\$20 million in funding for pilot programs to support the implementation of very early-in-life autism supports**, such as the program evaluated by Hudry and teams in the AICES trial.

## CASE STUDY:

### Suicide Response Project

Suicide is an issue which affects the Autistic and LGBTIQ+ communities in particular, as they can face unique challenges when it comes to mental health, often due to a lack of understanding. A multi-disciplinary team of experts at La Trobe University, along with people with lived experience of the challenges faced by Autistic and LGBTIQ+ communities, co-designed the [Suicide Response Project](#) website, which was launched in 2021 at the "Health, Wellbeing and Suicide Prevention in Autism" conference hosted by La Trobe University's **Olga Tennison Autism Research Centre** (OTARC).



*The SRP was funded by a Suicide Prevention Australia Suicide Prevention Research Fellowship awarded to A/Prof Darren Hedley.*

The resources on the website - including 12 free modules, animated videos and downloadable fact sheets - are underpinned by Dr Karien Hill's PhD research (supervised by A/Prof Carina Chan) on adapting the Bystander Intervention Model, which is highly effective at motivating people to act when a friend or family member is at risk of suicide. The website provides support to those at-risk from the Autistic and LGBTIQ+ communities focussed on knowledge-building and effective intervention techniques, and tips on how to detect and respond to suicide risk in others in a safe and supportive way.

In 2023, **these resources were adapted and published on the R U OK website as '[Tips to Help Support Neurodivergent People](#)'**, with videos covering myths, risk factors, warning signs, and who and how to help.

# HEALTHY PEOPLE, FAMILIES AND COMMUNITIES

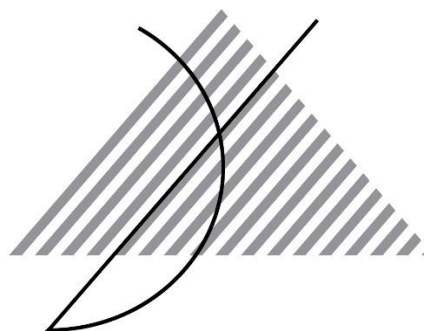
## CASE STUDY:

***Private Lives* is a period survey conducted by the Australian Research Centre in Sex, Health and Society (ARCSHS) at La Trobe University. It collects essential data on the health and wellbeing of LGBTIQ+ people in Australia.**

The first iteration of *Private Lives* in 2005 was the largest survey of its kind anywhere in the world, and was followed by surveys in 2011 and 2020, providing a unique longitudinal dataset recognised by the Australian Institute of Health & Welfare (AIHW) as the longest running, 'largest and most comprehensive available for the LGBTIQ+ population in Australia'.

*Private Lives* exposed for the first time the **previously hidden realities around the health and wellbeing of LGBTIQ+ people in Australia** including significant health and social disparities: higher rates of depression, anxiety, self-harm, attempted suicide, poverty and homelessness. In 2020, this data was used to identify LGBTIQ+ people as a priority population for mental health and suicidality for the first time in Australia. Commonwealth and state or territory health strategies must now tailor initiatives to specifically address and improve health equity for the LGBTIQ+ community as a priority population group.

As a unique data source, ***Private Lives* underpins the development of state and federal policies, strategies, commissions and action plans which affect the LGBTQA+ community.** These include [The Disability Royal Commission](#) (which includes 'original research [commissioned] from La Trobe University on the experience of LGBTQA+ people with



*As the largest and longest running survey of its kind, the data from *Private Lives* offers a unique mechanism for evaluating the progress and impact of changes in policy and practice over time.*

disability'), the [Victorian LGBTIQ+ Strategy: Pride in our future](#), the [NSW LGBTIQ+ Health Strategy 2022-2027](#) and the [ACT's Capital of Equality Strategy: Second Action Plan](#). Director of ARCSHS Adam Bourne is co-chair of the Victorian Government's LGBTIQ+ whole of government Taskforce and is also a member of the expert advisory group which will co-design the federal government's first 10 year National Action Plan, announced in March 2023, focused specifically on improving the health and wellbeing of LGBTIQ+ people.

In 2023, ARCSHS provided AIHW with data on suicide and self-harm from *Private Lives 3* and *Writing Themselves In 4*, aggregated by state/territory, age-group, gender and sexual orientation. In addition, the AIHW has engaged ARCSHS to undertake secondary analysis of the data from *PL3* and *WTI4*. This aggregated data is now accessible for the public, policy makers and practitioners.

Read more about our [Impact in Healthy People, Families & Communities](#) and the [Research behind it](#)



# RESILIENT ENVIRONMENTS AND COMMUNITIES

La Trobe researchers work in partnership with environment and community groups, government, industry and First Peoples to develop new approaches to ensure our ecosystems and natural resources are resilient, sustainable, biodiverse and protected.



## Pathways to impact in 2023:

- The Centre for Freshwater Ecosystems (CFE) is making a significant contribution to the research underpinning management of the Murray–Darling Basin through the **Murray Darling Water and Environmental Research Program (MD-WERP)**. MD-WERP is a 4-year \$20 million government initiative to improve basin outcomes which will provide critical input to the 2026 Basin Plan Review. La Trobe is leading two of the program’s themes: environmental outcomes, and social, economic and cultural outcomes.
- With funding from a Circular Economy Markets Fund grant from the Victorian Government (Sustainability Victoria), Associate Professor Ing Kong at La Trobe is investigating how **agricultural plastic waste** – such as baling twine, nets, covers and fertiliser bags which would otherwise have ended up in landfill, been burnt or processed off-shore - **can be effectively recycled locally** using Rtec’s novel melting technology, and used to generate new products such as fence posts and shipping pallets.

What is unique about MD-WERP is that its research focus recognises the value and benefits of water for communities in cultural, spiritual, social, health and economic terms, envisaging a far richer picture of Basin functions to help decision makers and managers to better protect the environmental and social future of the Basin.

Another important aspect of the program is the focus on predictive ecology. In an already variable climate, the impacts of climate change make future conditions within the Basin much less predictable. As part of MD-WERP’s drive towards predictive ecology, large datasets and a comprehensive spatial geodatabase have been compiled in order to generate predictive tools which can dynamically model the complex interactions in the Basin and predict ecosystem responses to changes in environmental conditions or proposed water management activities.

[Rtec \(Ritchie Technology\)](#) is a Victorian company whose Managing Director Dr William Ritchie studied at La Trobe University. Dr Kong is now working to validate the potential of the process and carry out performance trials of the demonstration products using a prototype of the machine in the lab at La Trobe University’s Bendigo campus.



*How can we protect the vital ecosystem of the Murray-Darling Basin, while also meeting the needs of agriculture, industry and the economy?*

# RESILIENT ENVIRONMENTS AND COMMUNITIES

## CASE STUDY:

### Farm-scale Natural Capital Accounting

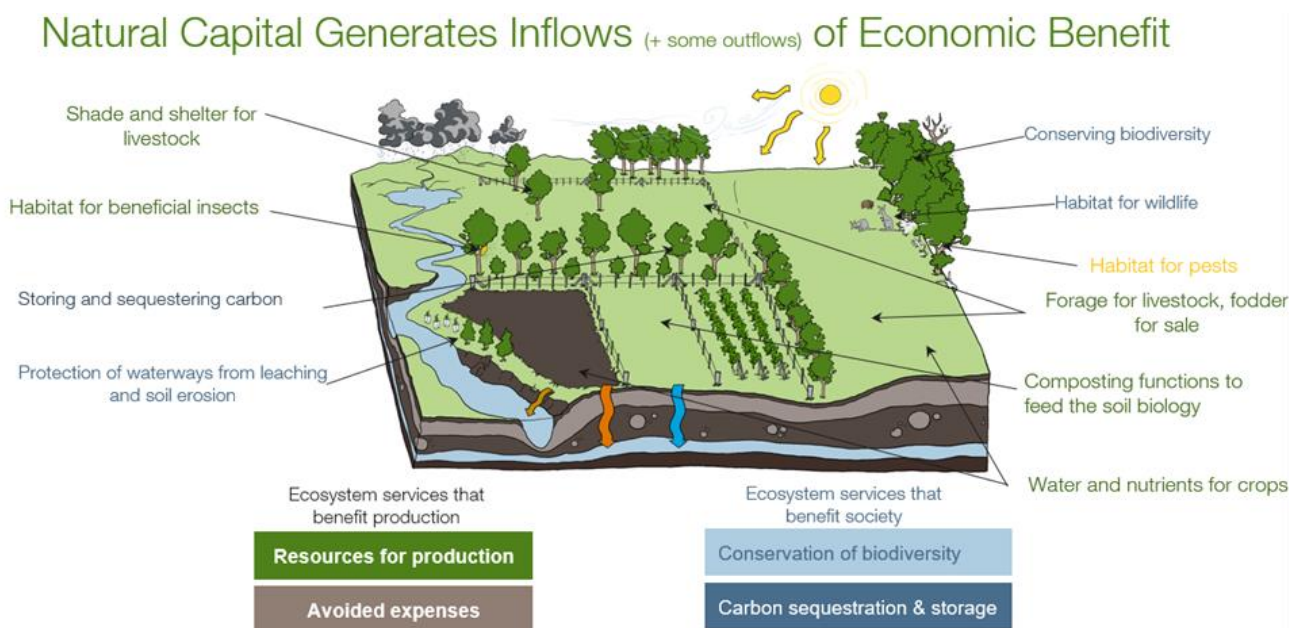
Natural capital refers to all living and non-living elements of the natural environment that combine to provide products and services that are of value to people and society. Natural capital is the foundation of all farming systems: soil and water support crops and pastures, plants provide food and shelter for livestock and regulate the micro-climate, and native animals provide services such as pollination, pest control and waste decomposition. A key challenge for farmers, however, is auditing their natural capital in a way which succinctly represents its value.

From 2020 to 2023, with funding from the Australian Government's Smart Farming Partnership Program, La Trobe University - with a consortium of nine industry partners, and in close collaboration with 50 farmers across New South Wales, Victoria and Tasmania - led the [Farm-scale Natural Capital Accounting](#) project in order to address this critical gap in sustainability reporting.

The project – the first of its kind in Australia and the world – developed a methodology for measuring and communicating farm-scale environmental performance and natural capital management, integrating remote sensed data, farm management data and biodiversity data to generate **50 farm-scale natural capital accounts**. The [accounts](#) provide farmers with verifiable information about the natural capital assets on their farm and the ecosystem services they deliver. This helps farmers communicate their environmental performance to their stakeholders in a format that is coherent with internationally recognised standards.

As sheep farmer Jo Bear from Loddon Vale describes:

***'This tool reduces our environmental footprint, it aligns with market demands and partnerships, shows the profitability of sustainable farming, fosters discussions with banks and authorities and brings well-being to farmers, families and communities.'***



# RESILIENT ENVIRONMENTS AND COMMUNITIES

## CASE STUDY:

### Species Protection at La Trobe

Through the citizen science project '[1 Million Turtles](#)' and the [TurtleSAT app](#), Dr James Van Dyke is collecting and using community generated data on **turtle populations**, nests and predation. Over 21,000 records have been created through TurtleSAT, with 877 nests and 1573 turtles saved. '1 Million Turtles' won the [2023 Eureka Prize for Innovation in Citizen Science](#).



*Over 1,500 freshwater turtles have been saved by citizen science.*

Artificial light at night (ALAN) disrupts the **circadian cues of animals** and can negatively affect critical behaviours fundamental to survival. Dr Kylie Robert's lab works on ways to mitigate the negative impacts of ALAN, developing lights that are less obtrusive. Robert's research is cited in Australia's [National Light Pollution Guidelines for Wildlife 2023](#), with the whole of Appendix J 'Terrestrial Mammals' drafted by PhD candidate Alicia Dimovski.

*Now on the Threatened Species register: the Fat-tailed Dunnart*



The **Fat-tailed Dunnart** was assumed to be abundant in Victoria until a series of surveys undertaken by Dr Emily Scicluna demonstrated that its [numbers have steeply declined](#). Scicluna's evidence led the Department of Energy, Environment and Climate Action (DEECA) to add dunnarts to the Threatened Species Register in June 2023. The species now qualifies for conservation measures such as habitat protection, predator control and investment in population maintenance.

The **black-eared miner** is listed as critically endangered. There remains only one population stronghold in the wild in the Mallee region of South Australia. A team of La Trobe researchers led by Katherine Harrisson and collaborators is revising and refining the phenotypic scoring system which is used to remove yellow-throated miners to improve the management and impact of [cross breeding and hybridisation](#).

Read more about our [Impact in Resilient Environments and Communities](#) and the [Research behind it](#).

# DIGITAL TECHNOLOGIES AND TRANSFORMATION

In 2023, La Trobe opened the Digital Innovation Hub as part of our Research & Innovation Precinct. Powered by major partnerships with Cisco and Optus, the Hub connects industry with experts in AI and machine learning, data analytics, and Internet of Things (IoT).



## Pathways to impact in 2023:

- **Freely Accessible Remote Laboratories (FARLabs) celebrated their 10<sup>th</sup> anniversary.** Now reaching over 700 schools from 20 countries, FARLabs provides an interactive laboratory network providing secondary students with virtual access to state-of-the-art facilities. In December, FARLabs hosted “Space Week” in collaboration with the Japan Aerospace Exploration Agency.



*Eleven AquaWatch monitoring sites have been established worldwide.*

- **CSIRO’s AquaWatch program was launched in May.** AquaWatch monitors and forecasts water quality to give early warnings of harmful events such as toxic runoff and algal blooms. Data obtained from an extensive array of satellites and in-situ monitoring devices is analysed for real-time water quality predictions using novel Artificial Intelligence algorithms developed by Prof. Wei Xiang’s team in the Cisco-LTU Centre for AI and Internet of Things (IoT), which is an Australian first specialising in the intersection of AI and IoT technologies.

## CASE STUDY:

### Deep Space Food Challenge

Vertical farms are an increasingly urgent solution needed for both space travel and optimisation of terrestrial resources. Gaia Project Australia have partnered with La Trobe University researchers to develop a novel vertical farm system, the Intelligent Crop Cultivation Module (ICCM), which progresses plants from one level of the farm to another as they grow. Led by Dr Alex Stumpf, the La Trobe team designed and prototyped the mechanism for transporting and expanding the grow channels. This adaptive system follows plants’ natural growth cycles to increase the efficiency of the farm by up to 40%.

In 2023, the [Gaia Project](#) (under the name “Enigma of the Cosmos”) was one of three international teams to win Phase 2 of **NASA’s Deep Space Food Challenge** along with five teams from the USA, and progress to further development of their solutions in Phase 3. The ICCM will now be tested in a simulated deep space environment to determine its efficiency and reliability under real-life operating conditions.

As well as providing astronauts with access to nutritious fresh food on deep space missions, the technologies developed in response to this challenge will revolutionise food production in environments on Earth as conditions become increasingly extreme and resources increasingly scarce.



# PATHWAYS TO IMPACT: RESEARCH INSTITUTES



## CARE ECONOMY RESEARCH INSTITUTE

*Launched in 2023, La Trobe's Care Economy Research Institute (CERI) is Australia's first Institute dedicated to all aspects of Care Economy research.*

Established in recognition of the crisis facing our care sectors, CERI's goal is to break down silos in the health and social care sectors and create an ecosystem to co-design and implement the next generation of services across all care economy domains.



*CERI's research spans five areas which draw on the cross disciplinary expertise of its members.*

- The [Care Technology](#) domain addresses how technologies can enhance the work of care givers and improve quality and safety of care systems.
- The [Care Workforce](#) domain is developing solutions supporting the recruitment, upskilling and retention of formal and informal carers who can transition across all the care sectors.
- The [Care Delivery](#) domain addresses the challenges related to fair and equitable access to health and social care.
- The [Care Experience](#) domain considers how the lived experience of Australian consumers can improve the current design and delivery of services.
- The [Care Economics, Social and Policy](#) domain is investigating what care models and innovative social care solutions align with an economically sustainable framework for health and social policy for Australia's diverse populations.

## LA TROBE INSTITUTE FOR SUSTAINABLE AGRICULTURE AND FOOD

*Launched in 2023, the La Trobe Institute for Sustainable Agriculture and Food (LISAF) takes a holistic "paddock-to-gut" approach in order to meet the challenge of providing sufficient and sustainable food.*

In 2023, La Trobe University was ranked #1 in Australia and #5 in the world for the UN Sustainable Development Goal **Zero Hunger**, which aims to increase agricultural productivity and ensure equitable access to food.

- LISAF leads the ARC's [Research Hub for Medicinal Agriculture](#). **Cann Group** is harnessing R&D collaborations with La Trobe University to accelerate the Company's plant breeding programs, develop tissue culture methods, and generate proprietary, resilient, high-yielding cultivars.



*La Trobe University glasshouse*

- National Collaborative Research Infrastructure Initiative (NCRIS) funds backed the establishment of a single cell 'Omics facility at AgriBio and the development of a Plant Protein Atlas. NCRIS also supports LISAF as the Victorian node of the **Australian Plant Phenomics Network (APPN)**, providing state-of-the-art phenomics that will provide research capability to rapidly screen plants for yield and early disease detection.