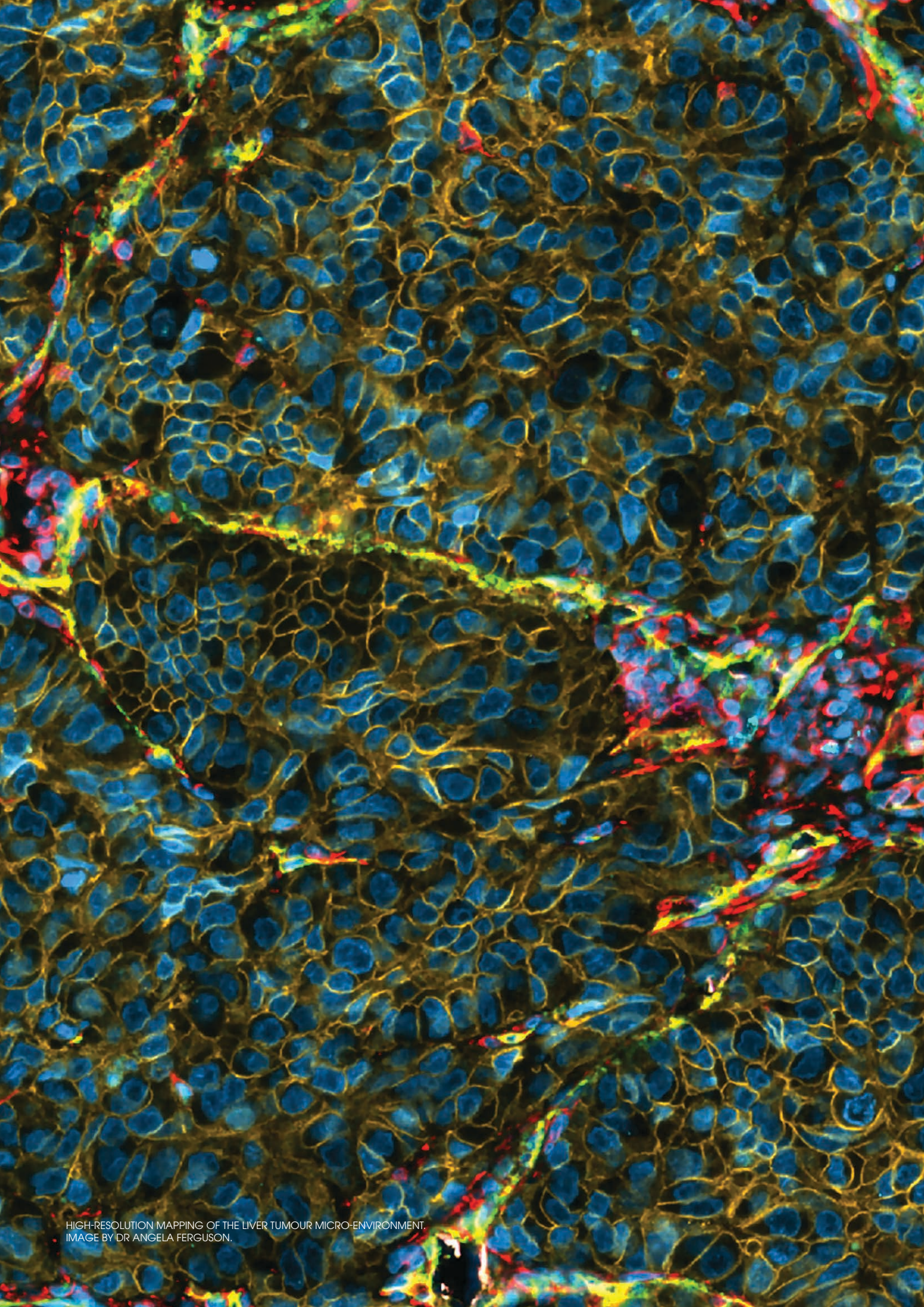


Centenary Institute

ANNUAL REPORT 2025

Centenary
Institute
life saving
research





HIGH-RESOLUTION MAPPING OF THE LIVER TUMOUR MICRO-ENVIRONMENT.
IMAGE BY DR ANGELA FERGUSON.

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COVER IMAGE: DR LISE HUNAUT, CENTRE FOR BIOMEDICAL AI



Chair's report



Over the past year, the Centenary Institute has continued to deliver outstanding discovery science, advancing our understanding of disease and laying the groundwork for future therapies. Our researchers have advanced knowledge across a broad range of health challenges, from liver disease and haemophilia A to inherited heart disease and next-generation gene therapy. These achievements reflect the depth of expertise at Centenary and our unwavering commitment to improving health outcomes for the community.

Equally, culture remains central to our success. A high-performing values-led working environment where people feel supported, respected and inspired to do their best work underpins excellence in scientific discovery. Centenary therefore continues to invest in its people to ensure the Institute remains a place where innovation can thrive.

In an increasingly competitive research environment, the Board has continued to focus on strengthening Centenary's long-term position. With intensifying funding pressures and rising research costs, careful stewardship and strategic foresight are more important than ever. We are continually seeking new opportunities to sustain, grow and accelerate our research efforts, with a clear focus on impact and future success.

A notable milestone this year was the commencement of construction of the Sydney Biomedical Accelerator (SBA), a state-of-the-art health facility led by the

University of Sydney and Sydney Local Health District. Set for completion in 2028, Centenary is proud to be the SBA's primary medical research partner. This landmark development will be transformative, providing unparalleled opportunities for Centenary researchers to advance and translate discoveries more rapidly, in the ongoing fight against disease.

It has also been pleasing to see even stronger connections develop between the Board and Centenary staff. Initiatives such as our Lunch and Learn sessions have created valuable opportunities for open dialogue, offering insight into the role of the Board and the leadership journeys of our Governors, while allowing us to hear directly from our researchers and professional teams.

I extend my sincere thanks to our Board and Committee members, donors, supporters and partners for their ongoing commitment. In particular, I acknowledge Elizabeth Dibbs, who is stepping down as a Board Governor after serving with distinction since 2013.

We were also deeply saddened by the passing of our Founding Patron, Professor The Honourable Dame Marie Bashir AD CVO early in 2026. A steadfast supporter of Centenary and its people, her legacy as a distinguished leader and health advocate will be remembered with great respect and gratitude.

Finally, my heartfelt thanks go to our dedicated researchers and the teams who support them. Your commitment enables Centenary to push the boundaries of medical research and help create a healthier future for all.

Joseph Carrozzi AM
Chair, Centenary Institute
X (formerly known as Twitter): @JosephCarrozzi



Executive Director's report



I am immensely proud of the progress made at the Centenary Institute in 2025. This year has been defined by outstanding science, meaningful real-world impact and the continued development of a positive, respectful and inclusive culture that supports our people to do their best work.

Our researchers have delivered exceptional scientific outcomes, with discoveries published in leading international journals including *Cell*, *Nature Communications* and *Blood Advances*. This reflects our scientific excellence and the influence of Centenary's research in shaping understanding of disease and informing future treatments. We also secured major grant success across areas including gene therapy, liver disease, rare autoimmune conditions and Alzheimer's disease, strengthening our capacity for future discovery and impact.

At the same time, we have seen the departure of a number of senior scientists. Although we regret losing valued colleagues, we take pride that Centenary is contributing to the rising trajectory, productivity and profile of our staff, making them highly sought after by other organisations. While change brings challenges, it also sharpens our focus. We are actively exploring strategies to ensure Centenary remains at the forefront of Australian medical research, attracting, developing and retaining exceptional scientific leaders and emerging talent.

It is now more than a year since we launched our Cultural Improvement Plan and the initiative continues to be implemented across the Institute. Fostering an environment where people feel safe, valued and empowered to do exceptional science remains our highest priority. I thank everyone for their ongoing contributions to uplifting our culture. Through regular engagement with teams, I continue to see positive progress, even as this important work continues.

2025 was a year of remarkable scientific outcomes. Our researchers uncovered new genetic causes of inherited heart conditions, providing families with vital answers and informing treatment and prevention. They also identified a cellular pathway with the potential to enable safer and more effective gene therapies. These advances sit alongside many other important research outcomes across areas including liver disease, COVID-19 and haemophilia A. They demonstrate the impact of discovery science at Centenary.

Community and sector engagement remained a strong focus. We hosted a public panel event exploring systemic changes faced by women in science and pathways for change. We announced a new philanthropic partnership with Cure The Future Foundation to accelerate research into rare genetic diseases and cancers. We also hosted community events in genetic heart disease and eye health, to demonstrate the real-world impact of medical research. Our 'When Art Meets Science' exhibition featuring at Government House as a part of Sydney Open Day was also a highlight.

As we look ahead, I extend my sincere thanks to our researchers, professional staff, Governors, partners and supporters. Your dedication continues to drive our mission and ensures Centenary is a place where exceptional science and a strong, values-driven culture go hand in hand.

Professor Marc Pellegrini
Executive Director, Centenary Institute

Board of Governors



Mr Joseph Carrozzi AM (Chair)
Appointed Chair in 2017
Appointed Governor in 2009
 President, NSW Business Chamber; Board member of Australian Chamber of Commerce & Industry (ACCI); Chair DigiCo REIT (ASX:DGT); Chair, HealthCo (ASX:HCW); Chair, Angus Knight Group; and Board Member, Football Australia (FA).



Mr Michael Coleman (Treasurer)
Appointed Governor in 2016
 Deputy Chair and Chair of the Audit committee for Planet Ark Environmental Foundation.



Mr Paul Chadwick
Appointed Governor in 2019
 Chair of Nanuk Asset Management; Vice President of the Sydney University Physics Foundatio; Board member of Alternative Investment Managers Association Australia.



Ms Elizabeth Dibbs
Appointed Governor in 2013
(retired 31 October 2025)
 Deputy Chancellor and Chair of Audit & Risk Committee of Western Sydney University (retired 31 December 2025); Board member and Chair of Audit & Risk Committee for the National Portrait Gallery; Chair of United Way Australia; Deputy Chair of ACT City Renewal Authority.



Professor Paul Kelly
Appointed Governor in 2021
 Former Chief Medical Officer at the Australian Government Department of Health (2020-2024) where he led the Government’s health response to the COVID-19 pandemic.



Ms Natasha Nankivell
Appointed Governor in 2017
 Founder and Partner of Global Alternative Funds. Over her career in investment banking and asset management which to date has spanned 35+ years, Natasha has held senior positions at The Carlyle Group, Macquarie Group and Merrill Lynch.



Professor Marc Pellegrini FAHMS
Appointed Governor in 2023
 Executive Director, Centenary Institute; Professor, Faculty of Medicine and Health at the University of Sydney; Professor, Department of Medical Biology, Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne.



Dr Chris Roberts AO
Appointed Governor in 2015
 Non-Executive Director of Sigma Healthcare, HMC Capital, Healthco Health and Wellness REIT, Clarity Pharmaceuticals, AtmoBiosciences Limited and Chairman of Nutromics Pty Ltd.



Ms Lisa Taliadoros
Appointed Governor in 2024
 Head of Intellectual Property and Australian Inclusion and Advancement Chair at a large global law firm and is consistently recognised as one of Australia’s leading intellectual property lawyers. Deputy Chair of the Intellectual Property Law Committee of the Business Law Section, Law Council of Australia (and convenor of the patents sub-committee). BSc and Grad. Dip. Sc. from Monash University and the University of Sydney (respectively). LLB from University of New South Wales.



Deb Wilcox
Appointed Governor in 2025
 Chief Executive of the Sydney Local Health District.



Foundation Trustees



Mr Joseph Carrozzi AM
Mr Michael Coleman (Treasurer)
Ms Elizabeth Dibbs
(retired 31 October 2025)
Mr Paul Chadwick

Board sub-committees



Investment Committee

Mr Paul Chadwick (Chair)
Mr Alastair Davidson
Ms Natasha Nankivell
Professor Marc Pellegrini

Risk and Audit Committee

Mr Michael Coleman (Chair)
Ms Elizabeth Dibbs (retired 31 October 2025)
Mr Peter Sutherland

Translation and Commercialisation Committee

Dr Chris Roberts AO (Chair)
Professor Mark Gorrell
Professor Phil Hogg
Dr Phil Kearney
Mr Jamie Nettleton
Professor Marc Pellegrini

People and Culture Committee

Mr Paul Chadwick (Chair)
Mr Joseph Carrozzi AM
Ms Alison Kent
Professor Marc Pellegrini

Founding Patron



The late Professor The Hon. Dame Marie R Bashir AD CVO

Financial highlights



	2025	2024	2023
	\$'000	\$'000	\$'000
INCOME			
Research Income			
Federal - NHMRC + ARC	\$3,395	\$4,553	\$4,550
NSW Government	\$2,635	\$3,318	\$4,818
Other Research Grants	\$8,528	\$6,713	\$4,132
Total research income	\$14,558	\$14,584	\$13,500
Other Income	\$9,184	\$7,498	\$7,707
Total Income	\$23,742	\$22,082	\$21,207
EXPENDITURE			
Research	\$17,443	\$16,808	\$17,220
Business Development, Finance, HR, IT, Management	\$6,390	\$6,837	\$3,614
Building	\$1,950	\$2,197	\$2,027
Other	\$675	\$323	\$710
Total Expenditure	\$26,458	\$26,165	\$23,571
Surplus for the Year	(\$2,716)	(\$4,083)	(\$2,364)
Other Income	\$896	\$287	\$228
Other Expenses	(\$4,281)		
Surplus for the Year	(\$6,101)	(\$3,796)	(\$2,136)
BALANCE SHEET			
Current Assets			
Cash and Receivables	\$2,706	\$12,872	\$13,843
Non Current Assets			
PPE & Investments	\$11,282	\$9,890	\$12,424
Total Assets	\$13,988	\$22,762	\$26,267
Current Liabilities			
Accounts Payable, Provisions, Deferred Income	\$9,789	\$12,424	\$12,189
Non Current Liabilities			
Provisions	\$363	\$400	\$344
Total Liabilities	\$10,152	\$12,824	\$12,533
Net Assets	\$3,836	\$9,938	\$13,734
Represented by:			
Accumulated Funds	\$9,938	\$13,734	\$15,870
Debt Forgiveness	(\$4,282)		
Retained Earnings	(\$2,716)	(\$4,083)	(\$2,364)
Revaluation Reserve	\$896	\$287	\$228
Accumulated Funds	\$3,836	\$9,938	\$13,734

RIGHT: SCANNING ELECTRON MICROSCOPY IMAGE OF A SPECIALLY COATED CONTACT LENS BEING DEVELOPED TO HELP RESTORE VISION. IMAGE BY DR MOJDEH ABBASI.



People and Culture



Centenary's impact is powered by a dedicated community of around 200 employees, students and visiting researchers, with roughly 80% directly involved in research.

In 2025, we made strong progress in implementing our Cultural Improvement Plan, developed in 2024 to help build a workplace where every individual feels valued, supported, respected and included.

A key milestone was the development of a new 'Code of Conduct' and a 'Values into Behaviour Framework'. Together, these initiatives clearly outline the standards of behaviour and ethical conduct expected at Centenary and help translate our organisational values into everyday practice. Comprehensive Code of Conduct training was rolled out across the Institute to ensure all staff understand these expectations and feel confident in applying them in their work.

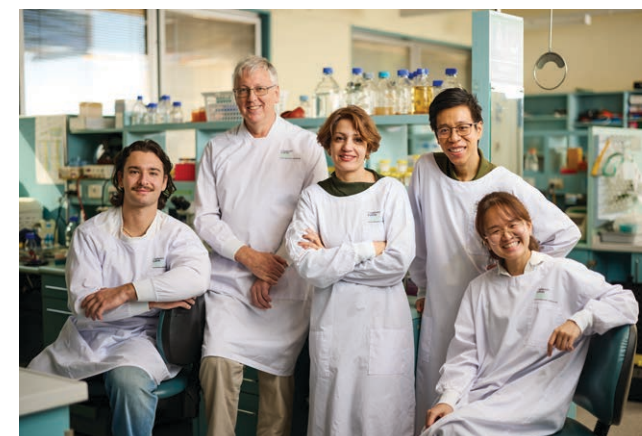
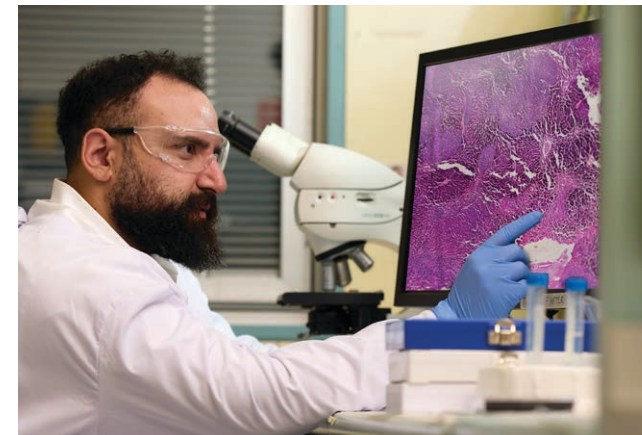
We also took important steps to address gender equity in our leadership team by proactively recruiting for a female Deputy Director. We proudly applied for and received an exemption from the Australian Human Rights Commission in order to target highly competent female candidates. This initiative reflects our

commitment to strengthening diversity and representation in the Institute. The appointment process is ongoing and an announcement will be made in due course.

Supporting the development of our people remained a major focus. We invested in the growth of Centenary's senior leaders through a targeted leadership development program, while also offering training opportunities for emerging and junior researchers to help embed leadership capability across the organisation.

Alongside these initiatives, we continued to invest in programs that promote a healthy and supportive workplace culture. These included our month-long Wellness Works initiative, educational sessions delivered by mental health experts, formal recognition programs celebrating staff achievements, and an uplift in our internal communications capacity to help strengthen connection and engagement across the Institute.

Together, these efforts are helping to foster a positive, inclusive and high-performing workplace that supports our people and enables the research community at Centenary to prosper.



Inclusion and Gender Equity Program



PROFESSOR DEVANSHI SETH CONCLUDES HER IMPACTFUL TENURE AS IGEP CHAIR

Centenary's Inclusion and Gender Equity Program (IGEP) continued to strengthen an inclusive and equitable research environment in 2025 through a broad range of events, training initiatives and professional development opportunities.

A highlight was IGEP's involvement in the panel discussion, 'Breaking through: The unspoken barriers for women in medical research', an external event organised by Centenary in collaboration with King & Wood Mallesons, to mark the International Day for Women and Girls in Science. This well attended event generated strong discussion around persistent barriers facing women in the sector while identifying practical ways to improve equity and inclusion across the research community.

International Women's Day was another focal point for IGEP. A panel discussion featuring speakers from diverse backgrounds and career stages, including Professor Nancy Baxter from the University of Sydney, explored leadership experiences, gender bias in academia, imposter syndrome and strategies to 'accelerate action' toward a more equitable workplace.

IGEP also delivered two events focused on intersectionality and inclusive leadership. A panel discussion introduced the concept of intersectionality and featured participants from the previous year's 'Intersectionality Walk' sharing their experiences. A follow-up workshop and walk was then held, facilitated by Ms

Annie Fenwicke (University of Sydney) and Professor Devanshi Seth. The 'Intersectionality Walk' explores how overlapping identities and experiences shape workplace inclusion. Around 80 per cent of participants reported a greater understanding of intersectional issues and ways to support more inclusive workplaces following the activity.

IGEP continued its long-standing support of professional development programs delivered by Franklin Women, sponsoring both mentors and mentees in the Inclusive Mentoring Program for the tenth consecutive year. While sadly, Franklin Women concluded its operations in late 2025, the partnership had a lasting positive impact on many Centenary researchers.

A further milestone was the introduction of new IGEP awards to support inclusive leadership and career development, including sponsored places in the Vital Leadership Masterclass Series and the Franklin Women Career YOU program.

The year also saw changes to the IGEP leadership team. Dr Paul Coleman stepped down as Convenor after five years of service and Professor Devanshi Seth concluded her term as IGEP Chair after nearly three years of dedicated leadership.

Dr Vrushali Chimankar was appointed Chair, a role later assumed by Dr Felix Marsh-Wakefield, with Dr Snega Sinnappan and Liny Tan joining as joint Convenors. The program remains committed to advancing equity, inclusion and positive workplace culture at Centenary.

Association Updates



Postdoc Association

The Postdoc Association had another successful year supporting the Institute's postdoctoral researchers through a range of professional and social activities. Within our monthly meetings, we had information sessions run by Dr Elinor Hortle to provide practical advice on improving grant applications, while Professor Mark Gorrell presented updates on important changes relating to University of Sydney affiliations and postdoctoral supervisory applications. The Association also continued to support the monthly Bioinformatics Club sessions run by Dr Chirag Parsania. These sessions have helped foster new collaborations across the Institute and have contributed to successful publications and grant applications. Building stronger social connections within the Centenary Institute was also a priority. The Association participated in the STEPtember health challenge and collaborated with the ReST and Student Association in hosting a body language workshop, to build confidence in the workplace and in presentations. Looking ahead, the new President for 2026 is Dr Mehdi Sharifi Tabar, with Dr Lise Hanault serving as President-Elect.

Chair: Dr Seakcheng Lim



ReST Association

The Research Assistants, Support and Technicians (ReST) Association provides a forum for members at the Institute to connect, support one another, explore opportunities for professional growth and offer insights to the leadership team. This year we held a seminar featuring Centenary leaders from across research groups and professional services teams who shared their career journeys and experiences. We also co-hosted a workshop with the PostDoc and Student Association which focused on effective body language when giving presentations. A highlight of the year was establishing a connection with a network of research assistant (RA) groups in Melbourne who hosted an RA symposium attended by several ReST members. Looking ahead, we hope to continue collaborations with the PostDoc and Student associations and encourage the formation of similar RA groups across other Sydney institutes.

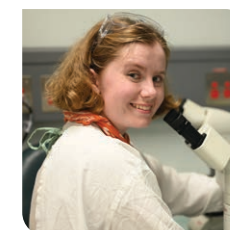
Chair: Serena Li



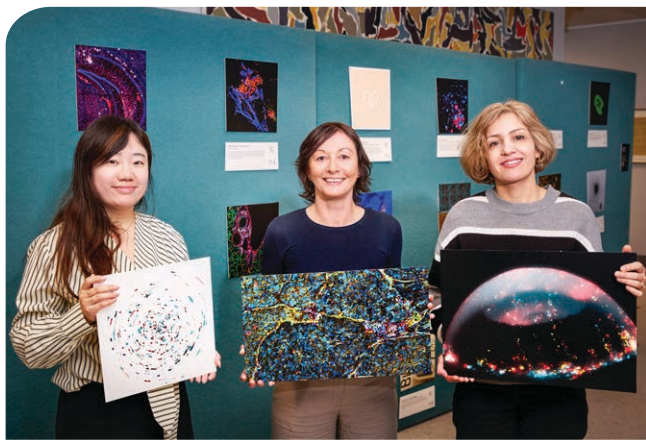
Student Association

The Student Association provides a forum for students to voice suggestions, concerns and propose initiatives to enrich student life. In 2025, we held quarterly meetings with a core group of members, fostering discussion and offering stakeholder advice to the Institute. A major highlight was contributing to the student open day, which transitioned to an online format in 2025. We were thrilled to collaborate with the Postdoc and ReST associations to bring the Impactful 'Body Language to Win Over Others' workshop to the Institute. Towards the end of the year, we also contributed to the development of the Centenary Excellence awards, which featured an expanded range of honours recognising individuals who embody Centenary values. In 2026, we look forward to continuing our collaboration with the Postdoc and ReST associations and will continue supporting student life and wellbeing at the Institute.

Chair: Jinx Moore



Engagement

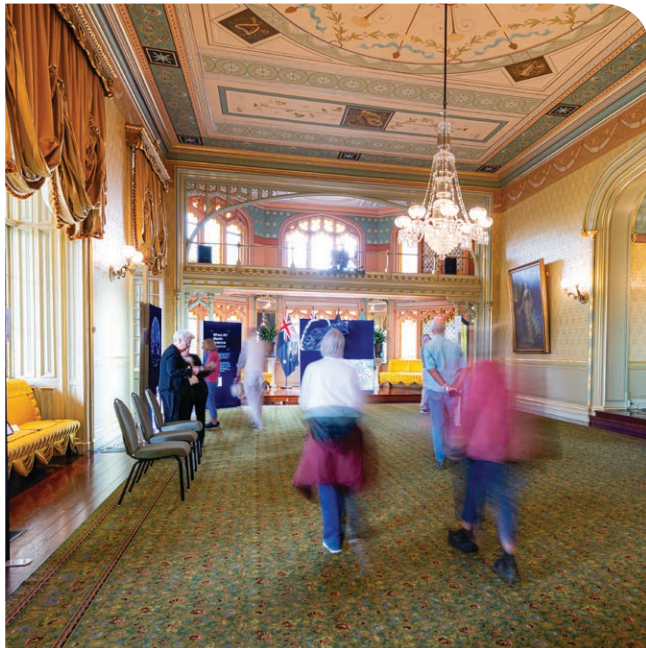


A breathtaking collection of images capturing the complexity of medical science was unveiled through our *When Art Meets Science* image prize competition and exhibition.



Above: We hosted *Science for Sight: Shaping the Future of Eye Health*, a community event designed to raise awareness of eye disease and its impact on people's lives.

Below: Our stunning medical research images were on display at *March Arts*, a Sydney Local Health District (SLHD) initiative bringing art into hospitals to promote wellbeing.



Above: We shared the beauty of science with the community through our *When Art Meets Science* exhibition, featured at Government House Sydney as a part of Sydney Open Day.

Below: The challenges faced by women in science took centre stage at our public panel discussion, *Breaking through: The unspoken barriers for women in medical research*.

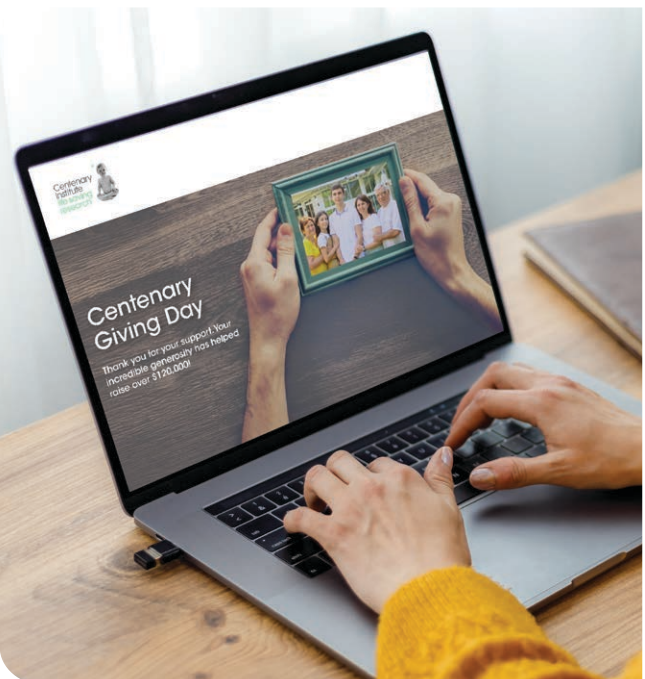


Philanthropy



Above: The Centenary Institute and Cure The Future Foundation announced an exciting new philanthropic partnership to accelerate research into life-changing treatments for rare genetic diseases and cancers.

Below: Our inaugural 2025 Giving Day raised over \$125,000 for the Centre for Cardiovascular Research and the Genetic Heart Disease Clinic, advancing our mission to improve heart health and save lives.



Above: Honouring Aiden Bellingham who was taken from friends and family at far too young an age, the annual Bellingham Cup raised over \$12,000 for Centenary research into sudden cardiac death in young people.

Below: Our year-end appeal raised vital funds for Alzheimer's disease research. A huge thank you to our generous donors for supporting our mission to tackle the most common form of dementia.





Centre for Biomedical AI



We focus on the application of AI technology to advance both basic and clinical medical research. This includes developing techniques for designing novel proteins; and producing therapeutics for untreatable cardiovascular, metabolic and metastatic diseases.

Centre highlights

In 2025, our Centre delivered a strong set of achievements that combined scientific leadership with clear potential benefit for patients and the broader community.

A standout was our *Nature Communications* paper on directed evolution in mammalian cells. In this work, we developed PROTein Evolution Using Selection (PROTEUS), a platform that allows proteins to be rapidly evolved directly inside mammalian cells. This matters because many proteins intended for human health are still developed in simpler systems such as bacteria or yeast, which do not fully reflect the complexity of human cells. By evolving proteins in a more relevant environment, we can create tools that are better suited to where they will eventually be used, the body. Using PROTEUS, we produced a more sensitive gene-control switch and a small antibody-like tool that responds to DNA damage. These results show the potential of this platform to improve how we control genes, track cell health and build future medical and biotechnology tools.

This work also underpinned a major funding success in 2025 - an Australian Research Council (ARC) Discovery Project grant that will combine laboratory evolution with machine learning to design proteins with new or improved functions. The aim is to make protein engineering faster, more precise and more accessible, helping overcome long-standing challenges in synthetic biology. In practical terms, this could accelerate the development of tailored proteins for gene regulation and biotechnology, and help move promising ideas more quickly toward real-world use. Together, the paper and the new grant position the Centre at the forefront of protein engineering in mammalian cells.

Our Centre also contributed to a further *Nature Communications* paper that examined how per- and polyfluoroalkyl substances (PFAS), often called 'forever chemicals', build up through food chains. The study showed that, on average, PFAS levels roughly double at each step up the food chain, helping explain why top

"We are developing smarter ways to design and evolve proteins in human cells, creating new tools for gene control, heart repair and biotechnology that can speed the path from discovery to real-world treatments and improve health for patients and communities."



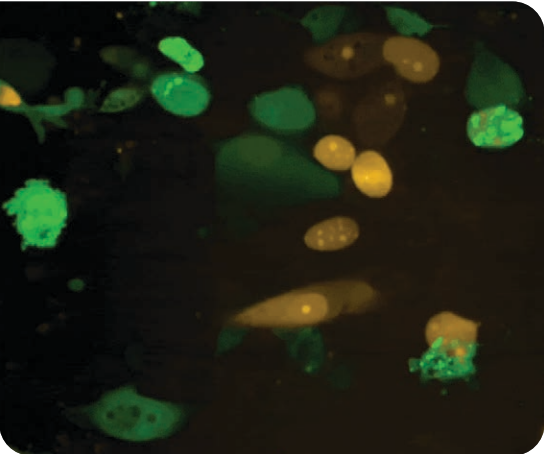
predators can carry greater chemical loads. This work has important implications for environmental monitoring, public health and the way chemical risks are assessed.

We also collaboratively secured a New South Wales (NSW) Health Cardiovascular Research Capacity Program grant focused on repairing the heart after a heart attack. Adult heart muscle has very limited ability to regrow, so damaged tissue is often replaced by scarring, increasing the risk of long-term heart failure. By developing better ways to deliver regenerative treatments to the injured heart, this project aims to support the growth of new heart muscle and blood vessels, improve recovery, and open the door to more effective therapies for people living with cardiovascular disease.

Finally, the Centre's Dr Alex Cole received a Tour de Cure grant to develop a therapy targeting mutant p53 proteins that are thought to drive cancer growth and spread. The project involves engineering a specialised protein to tag p53 and direct the cell's proteasome to break it down.

Head, Centre for Biomedical AI	Associate Professor Daniel Hesselson
Laboratories	Hesselson Laboratory
Disease areas	Heart disease Type 1 Diabetes Cancer

BELOW: AN ANALYSIS OF P53 PROTEIN DYNAMICS WITHIN THE CELL NUCLEUS FOLLOWING EXPOSURE TO CHEMOTHERAPEUTIC AGENTS. IMAGE BY DR ALEX COLE.



Centre for Cancer Innovations



We're focused on enhancing treatment outcomes for cancer patients. We employ innovative approaches to decipher the complex genetic and cellular mechanisms underlying various cancer types. Our goal is to advance the development of highly effective, precisely targeted treatments.

Centre highlights

This year, the research teams within the Centre for Cancer Innovations have continued to deliver high-impact discoveries while advancing new strategies aimed at improving outcomes for patients with hard-to-treat cancers.

The Yeo Laboratory contributed to several high-profile publications. Dr Dannel Yeo was first author on a study published in the journal *Cellular and Molecular Life Sciences* demonstrating the promise of liquid biopsy biomarkers to better predict risk for pancreatic cancer relapse. He was also a co-author on the landmark study published in *Nature Medicine* investigating a triple-drug immunotherapy approach for the treatment of aggressive brain cancer (glioblastoma).

The Lyons Laboratory advanced research in both regenerative medicine and cancer biology. The team is developing a new pipeline to treat corneal blindness caused by limbal stem cell deficiency by reprogramming a patient's own blood cells into stem cells, progressing personalised

therapies. They have also identified molecular pathways that enable head and neck cancer cells to communicate with neighbouring cells and drive tumour growth, revealing new potential targets for treatment.

The Gorrell Laboratory published important findings in *Biochimica et Biophysica Acta – Molecular Basis of Disease*, that found that removing a specific protein (DPP9) from liver cells in mice helped slow the growth of liver cancer, suggesting that targeting this protein could lead to new treatments for the disease in humans. Lead author from this study Jiali Carrie Huang was awarded her PhD from the University of Sydney for this work. Additionally, and in recognition of his leadership in the field, Professor Mark Gorrell received a Springer Nature Editorial Contribution Award for his outstanding service to the journal *Scientific Reports*.

The Tiffen Laboratory secured major international recognition and support, receiving a prestigious three-year Melanoma Academy Scholar Award from the US Department of

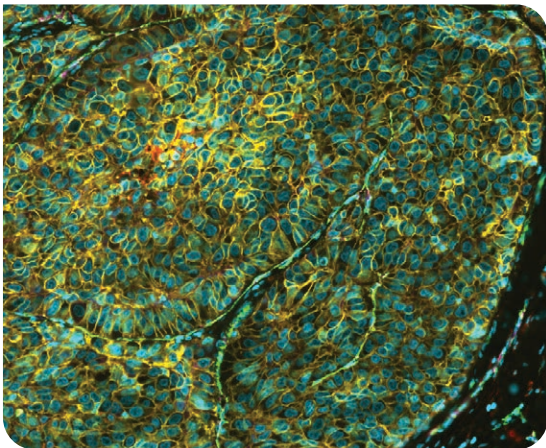
“We are working to accelerate breakthrough discoveries, transform cancer care, and empower patients by combining cutting edge science with real world translational impact—driving earlier detection, better treatments, and healthier futures for cancer patients everywhere.”



Defense's Congressionally Directed Medical Research Program. This funding will support investigations into genes on the X chromosome that appear to protect women from melanoma, with the aim of informing future sex-specific treatment strategies.

In other research success, the Hogg Laboratory, specialising in diagnostics and therapies for cancer as well as biochemistry, published a paper in *Blood Advances*, identifying why some people with haemophilia A develop resistance to their essential treatment. Co-led by first authors Dr Aster Pijning and Dr Diego Butera, the study provides important new knowledge to guide the development of more effective therapies.

Finally, we also congratulate Colista Tsao of the McCaughan Laboratory, who was awarded Honours (Class I) in their study, reflecting the Centre's strong commitment to nurturing the next generation of medical researchers.



Head, Centre for Cancer Innovations

Dr Jessamy Tiffen

Laboratories

Gorrell Laboratory
Hogg Laboratory
Lyons Laboratory
McCaughan Laboratory
Tiffen Laboratory
Yeo Laboratory

Disease areas

Cancer
Liver cancer
Melanoma
Skin cancer
Head and neck cancer
Eye cancer
Pancreatic cancer
Gastrointestinal cancers
Thoracic cancers

LEFT: A HIGH-RESOLUTION MICROSCOPIC VIEW OF HEPATOCELLULAR CARCINOMA (HCC) CELLS, THE MOST COMMON FORM OF LIVER CANCER. IMAGE BY DR ANGELA FERGUSON.

Centre for Cardiovascular Research



We're focused on translating precision medicine to improve the care of families with inherited heart disease and sudden death.

Centre highlights

In February 2025, we helped launch a new clinical service dedicated to caring for families following sudden cardiac death in the young. This fortnightly clinic, based at the Charles Perkins Centre Royal Prince Alfred Clinic and led by Associate Professor Belinda Gray, provides specialist cardiac evaluation to bereaved family members. Families are referred directly from the NSW Forensic Pathology Service, enabling timely clinical assessment and ongoing care for those at potential risk.

A key component of the service is the provision of clinically accredited postmortem genetic testing to identify underlying inherited causes of sudden cardiac death. Identifying a genetic cause can help guide clinical management and enable at-risk relatives to be identified earlier, offering families answers and the opportunity for prevention.

The clinic is closely integrated with our research program at the Centenary Institute. As part of this effort, our PhD student Yuchen Chang systematically reanalyses genetic testing data from affected families to identify previously unrecognised genetic causes of sudden cardiac death, ensuring that advances in research rapidly translate into improved diagnostic outcomes.

Centre Head, Associate Professor Richard Bagnall, highlighted the establishment of this new service and recent research discoveries in sudden cardiac death during an invited Barbara Ell Seminar at the Victor Chang Cardiac Research Institute.

Richard was also honoured to co-chair the 48th Annual Scientific Meeting of the Human Genetics Society of Australasia. The meeting is a major annual gathering for human genetics professionals across Australasia. PhD student Emma Singer added to the Centre's strong presence, delivering an oral presentation on her work developing a high-throughput assay to determine the clinical validity of genetic variants in a key heart disease gene.

The Centre's research also continued to expand scientific knowledge through publications in leading journals. A highlight was a study published in *Genetics in Medicine* (first author Yuchen Chang), which re-examined data from the Australian Genomics Cardiovascular Disorders Flagship. This national program originally sequenced the genetic material of more than 500 Australians living with cardiomyopathy or primary arrhythmia syndromes. Through deeper analysis, the team was able to give an

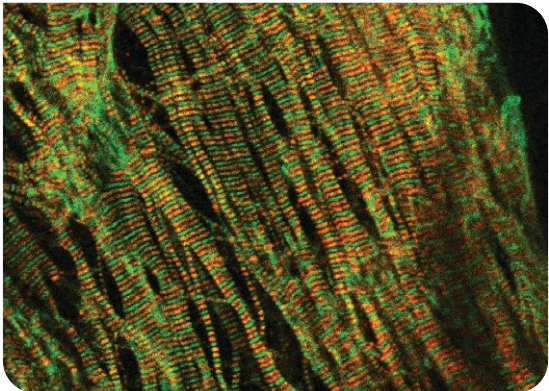
"We help provide a statewide clinical service for families affected by the sudden death of a young person, combined with an integrated genetics research program to understand why these tragedies occur and how they can be prevented in the future."



extra 4% of participants a confirmed genetic diagnosis that earlier testing had missed.

The Centre has also deepened its engagement with the community. Dr Seakcheng Lim and Richard attended the launch of Alexandra's Mission, founded in loving memory of Alexandra Thoms, who died from an undiagnosed cardiomyopathy at just 23 years of age. The initiative aims to help prevent sudden cardiac death in young Australians and support affected families. Richard and Yuchen also attended the annual Walk for Life event in Centennial Park, which brings together families and friends of young people who have died suddenly and without explanation.

Together, these clinical, research and community initiatives reflect our Centre's ongoing commitment to understanding and preventing sudden cardiac death in the young.



Head, Centre for Cardiovascular Research

Associate Professor Richard Bagnall

Laboratories

Bagnall Laboratory

Disease areas

Sudden cardiac death in the young
Sudden unexpected death in epilepsy
Cardiomyopathy
Cardiac arrhythmia syndromes

LEFT: STRIATED SARCOMERE ACTIN (GREEN), MYOSIN BINDING PROTEIN (YELLOW) AND FHOD3 (RED) IN PATIENT-DERIVED CARDIOMYOCYTES GROWN FROM REPROGRAMMED STEM CELLS. IMAGE BY SERENA LI.

Centre for Healthy Ageing



We're focused on understanding what drives cellular ageing and how this biological process causes disease. We use this information to treat and aid the prevention of diseases of ageing including dementia, liver failure and sarcopenia/frailty to promote health ageing.

Centre highlights

The Centre for Healthy Ageing has had a strong year of discovery and research leadership with our researchers making significant advances in understanding the biological pathways that drive the ageing process and age-related diseases.

Centre Head, Professor Andy Philp contributed to several high-profile studies. In *Experimental Physiology* he co-authored research showing that ageing causes fast-twitch muscle fibres to deteriorate because they lose their connection to the nervous system. He was also a co-senior author of a study in the *Journal of Cachexia, Sarcopenia and Muscle* demonstrating that healthy, lean older men can build muscle as effectively as younger men by increasing cellular sensors such as mTORC1. Additionally, in *Science Advances*, Professor Philp contributed to work revealing how blocking a specific chemical signal in certain pancreatic cancers may help stop the cancer from spreading and prevent muscle wasting.

A further Centre highlight was the recognition of Professor Devanshi Seth for her

global contributions to liver disease research and her leadership in the field. She was awarded the 'Healthcare Impact' category at the STEM Sisters 2025 Women of Colour in STEM Awards, an honour that reflects both the significance of her work and its real world influence. The Awards celebrate innovative women who, drive change and break barriers, lighting the way for future generations.

The Centre's influence was also central to the national scientific dialogue at the Australian Biology of Ageing Conference 2025. As conference convenor, Professor Philp facilitated critical discussions among the nation's leading scientists in this space. Centre researchers were prominently featured with Professor Jenny Gamble presenting her work on vascular leakage and its links to Alzheimer's disease, while Professor Seth discussed advancements in geriatric pharmacology. Additionally, Dr Isabelle Alldritt shared crucial insights into how exercise training can mitigate the effects of sarcopenia.

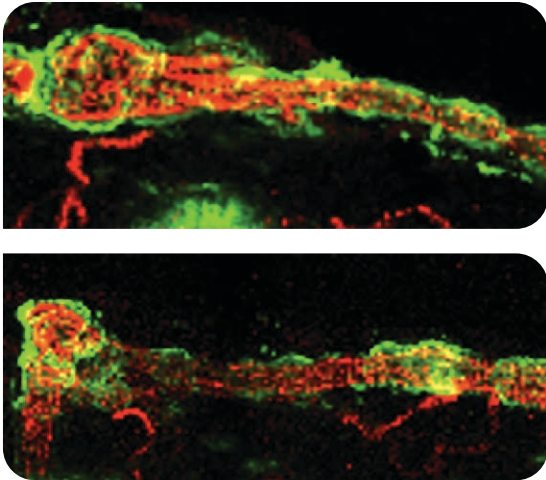
In a final high point, the Centre's Professor Jennifer Gamble was awarded a Heart

"Through groundbreaking research into muscle health, the liver and Alzheimer's therapies, we are seeking to transform how we age. By bridging biological discovery with clinical innovation, we are empowering society with the tools to prevent disease, restore function and ensure Australians live healthier, more active lives."



Foundation Catalyst Partnership Grant to develop a novel drug therapy for Alzheimer's disease. In collaboration with Professors Michael Parker (University of Melbourne) and David Celermajer (Royal Prince Alfred Hospital), this project is focused on improving brain health by mending leaky blood vessels, restoring their function and enhancing the clearance of toxic amyloid deposits.

Through these diverse achievements, the Centre for Healthy Ageing is working to ensure that Australians can live healthier, more vibrant lives as they age.



Head, Centre for Healthy Ageing

Professor Andy Philp

Laboratories

Gamble Laboratory
Philp Laboratory
Seth Laboratory

Disease areas

Ageing
Alcohol-related liver diseases
Alzheimer's disease
Aortic disease
Cancer cachexia
Duchenne Muscular Dystrophy
Frailty
Heart failure
Long COVID
Sarcopenia

LEFT: PRE AND POST-TREATMENT IMAGES FROM ALZHEIMER'S DISEASE RESEARCH SHOWING AMYLOID PLAQUES (GREEN) AND BLOOD VESSELS (RED). FOLLOWING DRUG TREATMENT, THE LOWER IMAGE SHOWS A MARKED REDUCTION IN PLAQUES, INDICATING EFFECTIVE CLEARANCE FROM VESSEL WALLS. IMAGES BY DR KA KA TING.

Centre for Infection and Immunity



We aim to make important basic discoveries that advance our understanding of immune responses. Our longer-term goal is to use this knowledge to manipulate immune cells with the aim of developing new treatments and vaccines that can prevent or limit pathogen infections and reduce immune-related diseases.

Centre highlights

The Centre continued to lead in infectious disease, vaccine and immunological research in 2025, delivering strong scientific impact.

A highlight was hosting the 2025 Annual Research Symposium of the NHMRC-funded Centre of Research Excellence in Tuberculosis Elimination (TB-CRE). Reflecting the Centre’s leading role in TB research, the meeting brought together experts from across Australia and the Indo-Pacific, showcasing advances in TB detection, diagnosis, prevention, modelling, community engagement and disease control.

Strengthening global preparedness for respiratory infections, Professor Warwick Britton’s group contributed to a major international PREDICT-19 Consortium study published in *Scientific Data*. Analysing blood samples from over 500 patients across five countries, spanning COVID-19, influenza, sepsis, and other infections, the study mapped the body’s molecular response to disease. Centenary’s contribution of COVID-19 samples and respiratory expertise helped generate a powerful reference resource to support earlier diagnosis, biomarker discovery, more targeted treatments and improved pandemic preparedness.

The Centre also progressed next-generation vaccine research. Professor Angelo Izzo co-authored a collaborative paper with the University of Texas at Dallas in *Advanced Healthcare Materials* on novel tuberculosis vaccine delivery platforms. He also presented on new TB vaccine adjuvants at the Collaboration for TB Vaccine Discovery and VALIDATE (Vaccine development for complex intracellular neglected pathogens) Network meetings held in Cape Town.

A NSW Health-funded collaborative study led by Professor Britton and Dr Anneliese Ashhurst (University of Sydney) and published in *Frontiers in Immunology*, demonstrated the potential of a nasal COVID-19 vaccine. The pre-clinical study showed strong immune responses in both the nose and bloodstream, and as a booster, achieved full protection, with no detectable virus in the lungs or brain.

Complementing this work, Dr Claudio Counoupas and PhD student Elizabeth Chan contributed to the development of CoVEXS5, a next-generation COVID-19 vaccine candidate. Reported in *npj Vaccines*, the candidate provided broad protection against multiple

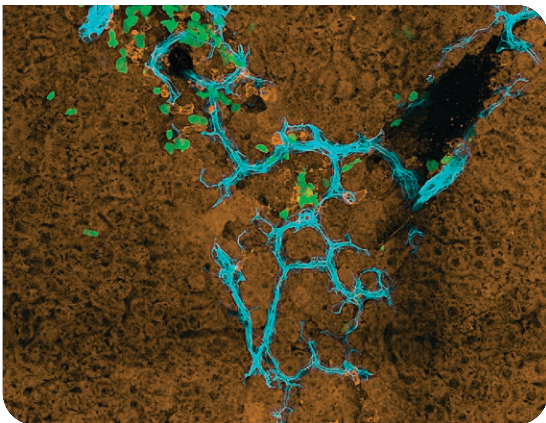
“We are committed to advancing understanding of basic cellular events during immune responses to develop safer, more effective treatments and vaccine strategies for COVID-19, tuberculosis and other pathogens. Our research improves global health security and the fight against emerging infectious diseases.”



coronaviruses, including Omicron XBB.1.5 and SARS-CoV-1 and reduced lung viral loads in pre-clinical models by approximately 99.9%.

Centre researchers also made advances in malaria and liver immunology. Associate Professor Patrick Bertolino co-authored a collaborative study led by Dr Daniel Fernandez Ruiz (Peter Doherty Institute and UNSW Sydney). Published in *PLOS Pathogens*, the study found that an experimental malaria vaccine can train the immune system to generate long-lasting protection in the liver.

Further strengthening this area, Associate Professors Bertolino and David Bowen were awarded a 2025 GESA Project Grant to investigate how gut-derived microbial signals shape immune responses in the liver. They also secured a \$1.35 million NHMRC Ideas Grant to explore how the immune system coordinates with the liver’s portal tracts. Together, these studies aim to uncover mechanisms driving liver inflammation and infection, supporting the development of more effective therapies for diseases including hepatitis and malaria.



Head, Centre for Infection and Immunity

Associate Professor Patrick Bertolino

Laboratories

Bertolino and Bowen Laboratory
Britton Laboratory
Izzo Laboratory

Disease areas

Viral hepatitis (HBV and HCV)
Malaria
Tuberculosis
COVID-19
Organ allograft rejection
Chronic liver disease
Influenza
Leprosy
Liver cancer

LEFT: CONFOCAL IMAGE OF A MOUSE LIVER SHOWING THE BILE DUCT SYSTEM (BLUE) AND IMMUNE CELLS (CD8 T CELLS, GREEN) TAKEN IN THE COURSE OF EXPLORING LIVER IMMUNITY. IMAGE BY DR KIERAN ENGLISH.

Centre for Inflammation



“The Centre for Inflammation has been an outstanding example of collaboration and discovery, delivering important insights into how inflammation drives serious disease and how these processes could be targeted to inform future treatments.”



The Centre for Inflammation, which concluded in late 2025, focused on developing effective treatments for some of the most challenging respiratory and inflammatory diseases by deepening understanding of their underlying mechanisms. This work led to the identification of new therapeutic targets and the development and testing of novel therapies.

Centre highlights

The Centre for Inflammation, the first joint initiative between the Centenary Institute and the University of Technology Sydney (UTS), was established to advance understanding of the biological mechanisms that drive inflammation and its role in human disease.

Over seven years, the Centre has focused on how inflammatory processes contribute to the development and progression of major conditions, including respiratory disease (chronic obstructive pulmonary disease, severe asthma and pulmonary fibrosis), COVID-19, stroke, inflammatory bowel disease and cancer.

The Centre has come to a natural end in late 2025 after seven years of success and high productivity following the departure of its Head, Professor Phil Hansbro. During this time, its researchers published extensively in leading scientific journals, generating important insights that are helping to inform the development of new therapeutic approaches for serious and often debilitating diseases.

Throughout 2025, Centre researchers authored and co-authored a number of significant articles.

In a collaborative paper led by the Centre with UTS and published in *Molecular Therapy*, researchers showed that a protein called vitronectin plays a protective role in lung tissue. The study found that vitronectin levels are reduced in people with COPD and in models of cigarette smoke exposure, leading to increased inflammation, breakdown of lung structure, more severe emphysema and poorer lung function. These findings suggest that loss of vitronectin contributes directly to lung damage in COPD and may represent a potential target for future treatments.

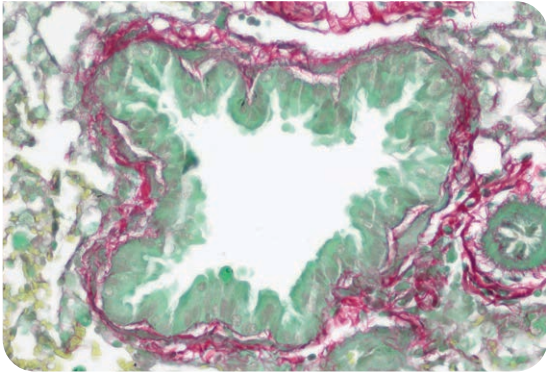
In another collaboration with UTS, an editorial published in *Expert Opinion on Therapeutic Targets* highlighted the role of enzymes released by mast cells, particularly chymase-1 and tryptases, in driving inflammation and lung damage in COPD. The authors proposed that targeting these enzymes could offer a promising new approach for improving COPD treatment.

Centre researchers also contributed as co-authors in several high-impact studies. A paper published in the *Journal of Experimental Medicine* demonstrated that

specific chemicals in cigarette smoke bind to the immune molecule MR1, weakening antiviral and antibacterial immune responses in the lungs and contributing to smoke-related lung disease.

In *Frontiers in Cell and Developmental Biology*, Centre researchers and collaborators reported that drugs such as metformin, aspirin and resveratrol, along with a novel peptide, can reduce harmful oxidative stress and improve cell function in ways that may help prevent or treat preeclampsia.

As the Centre for Inflammation concludes, its scientific legacy lives on through the researchers it has supported and the knowledge it has generated. By deepening understanding of how inflammation drives disease, the Centre has laid a foundation for future therapies that will ultimately improve health outcomes for people in Australia and around the world.



Head, Centre for Inflammation

Professor Philip Hansbro

Laboratories

Hansbro Laboratory

Disease areas

- Chronic obstructive pulmonary disease (COPD)
- Lung fibrosis
- Asthma
- Lung cancer
- Bushfire smoke exposure
- Cystic fibrosis
- COVID-19
- Influenza and mycobacterial infection
- Gut disease

LEFT: MOUSE LUNG TISSUE SECTION SHOWING COLLAGEN BUILD-UP (RED) AND AIRWAY EPITHELIAL CHANGES IN A STUDY OF MICROPLASTIC EXPOSURE. IMAGE BY DR KESHAV RAJ PAUDEL.

Centre for Rare Diseases and Gene Therapy



We're focused on understanding fundamental gene regulation mechanisms to guide therapies for rare diseases. We aim to improve the lives of people with inherited metabolic and blood disease, as well as cancer and chronic inflammation through enhanced gene therapy or targeted cell therapy treatments.

Centre highlights

2025 was a landmark year for the Centre, highlighted by a significant breakthrough in gene therapy research. This critical discovery could lead to safer and more effective gene therapies for a range of serious genetic disorders including Duchenne muscular dystrophy, Pompe disease and haemophilia. Published in the leading biomedical journal *Cell*, the research identified a previously unknown gateway into human cells, a receptor called AAVR2, that gene therapy viruses use to deliver therapeutic genes.

Gene therapies typically use modified viruses called adeno-associated viruses (AAVs), to deliver healthy genes into the body. These treatments have the potential to be life-changing for patients, their families and caregivers. However, they frequently require high vector doses to achieve therapeutic effects which in some cases can trigger severe immune responses, lead to serious complications, or even death.

Using advanced genetic, biochemistry and molecular biology techniques, Associate Professor Bailey's team demonstrated that AAVR2 plays a crucial role in helping several

AAV types - including those widely used in patients - enter cells more efficiently. By revealing this entry pathway, the research provides important insight into how viruses used in gene therapy interact with human cells.

The discovery has important implications for the development of next-generation gene therapies. Improving the efficiency with which therapeutic viruses enter cells could allow lower viral doses to be used in treatments, helping to reduce side effects, lower treatment costs and improve patient outcomes.

This research breakthrough was pivotal in securing a prestigious NHMRC Ideas Grant for \$1,944,000 awarded to the Centre's Associate Professor Bailey and Dr Bijay Dhungel. Commencing in 2026, the project will focus on improving the accessibility and safety of AAV gene therapies. This follows an earlier NHMRC Ideas Grant awarded to the same team in 2025.

Supporting the next generation of scientists has also remained a priority. During the year, the Centre welcomed student interns from India, Germany and Wales who all conducted seven month projects within the Bailey

"Our research focus has important implications for the future of gene therapy, offering new strategies to tailor treatments, lower required doses and mitigate the immune-related complications that have limited some current approaches. This will ultimately help to improve the accessibility of gene therapies to patients."



Laboratory. The Centre also hosted medical and biomedical engineering students, as well as School of Medical Sciences (University of Sydney) honours students, helping to foster a vibrant and diverse research environment.

Associate Professor Bailey also continued to strengthen partnerships with external stakeholders and supporters of the Centre, including the University of Sydney and Royal Prince Alfred Hospital in forward planning for the Sydney Biomedical Accelerator.

Partnerships with Cure the Future and Tour de Cure which have both supported Centre research programs were also strengthened.

Additionally, Tour de Cure recognised Associate Professor Bailey's efforts with a 200th *Funded Research Breakthrough Award* while also naming him *Volunteer of the Year*.

Head, Centre for Rare Diseases and Gene Therapy

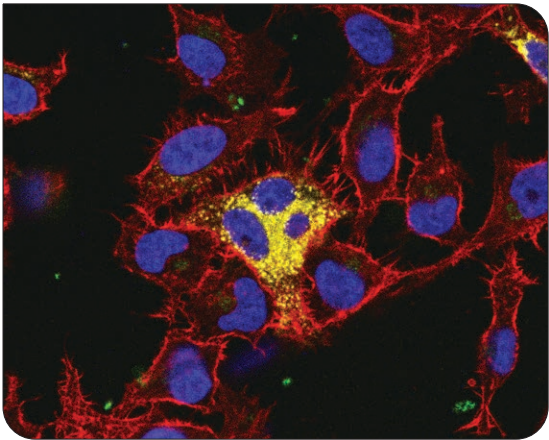
Associate Professor
Chuck Bailey

Laboratories

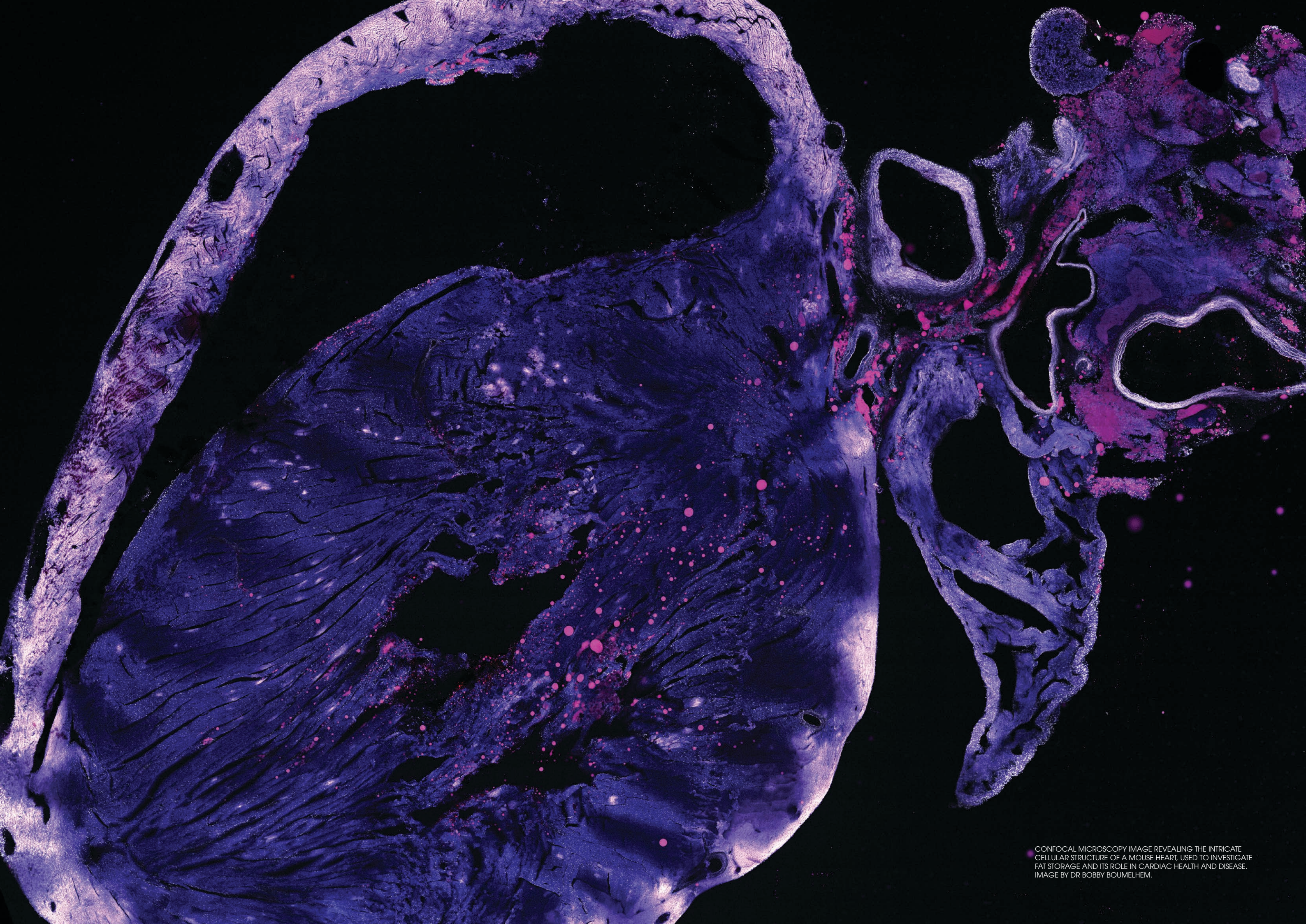
Bailey Laboratory

Disease areas

Pompe Disease
Haemophilia
Endometrial cancer
Leukaemia
Mesothelioma
Pancreatic cancer



LEFT: CONFOCAL MICROSCOPY IMAGE DEPICTS A LIVER CELL LINE EXPRESSING AN ADENO-ASSOCIATED VIRUS (AAV) RECEPTOR, WHICH IS IMPORTANT TO UNDERSTANDING HOW AAV GENE THERAPIES ENTER CELLS. IMAGE BY JOSEPH VITALE.



CONFOCAL MICROSCOPY IMAGE REVEALING THE INTRICATE CELLULAR STRUCTURE OF A MOUSE HEART, USED TO INVESTIGATE FAT STORAGE AND ITS ROLE IN CARDIAC HEALTH AND DISEASE. IMAGE BY DR BOBBY BOUMELHEM.



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